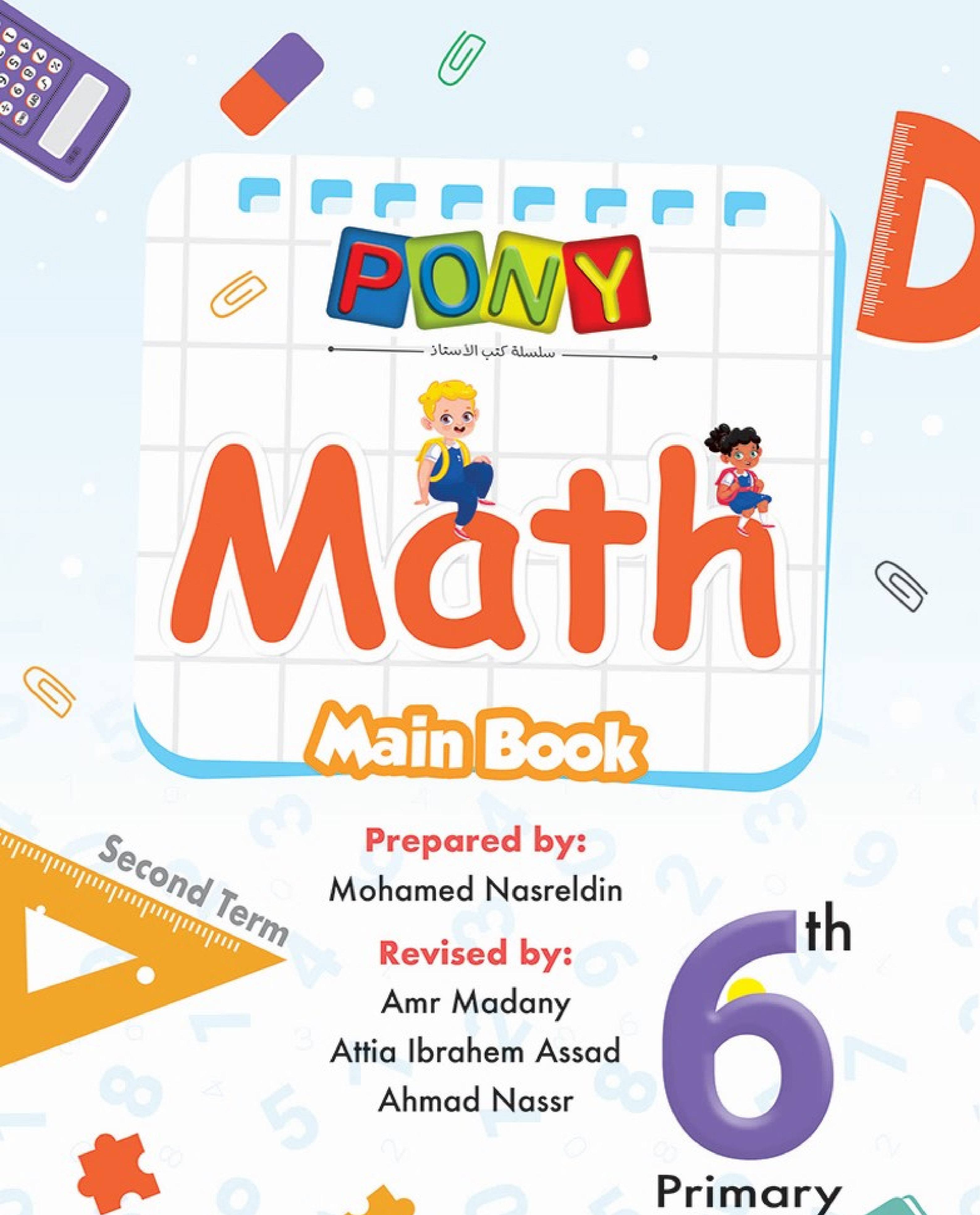

PONY
سلسلة كتب الأستاذ
Math
Main Book
Second Term
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Primary

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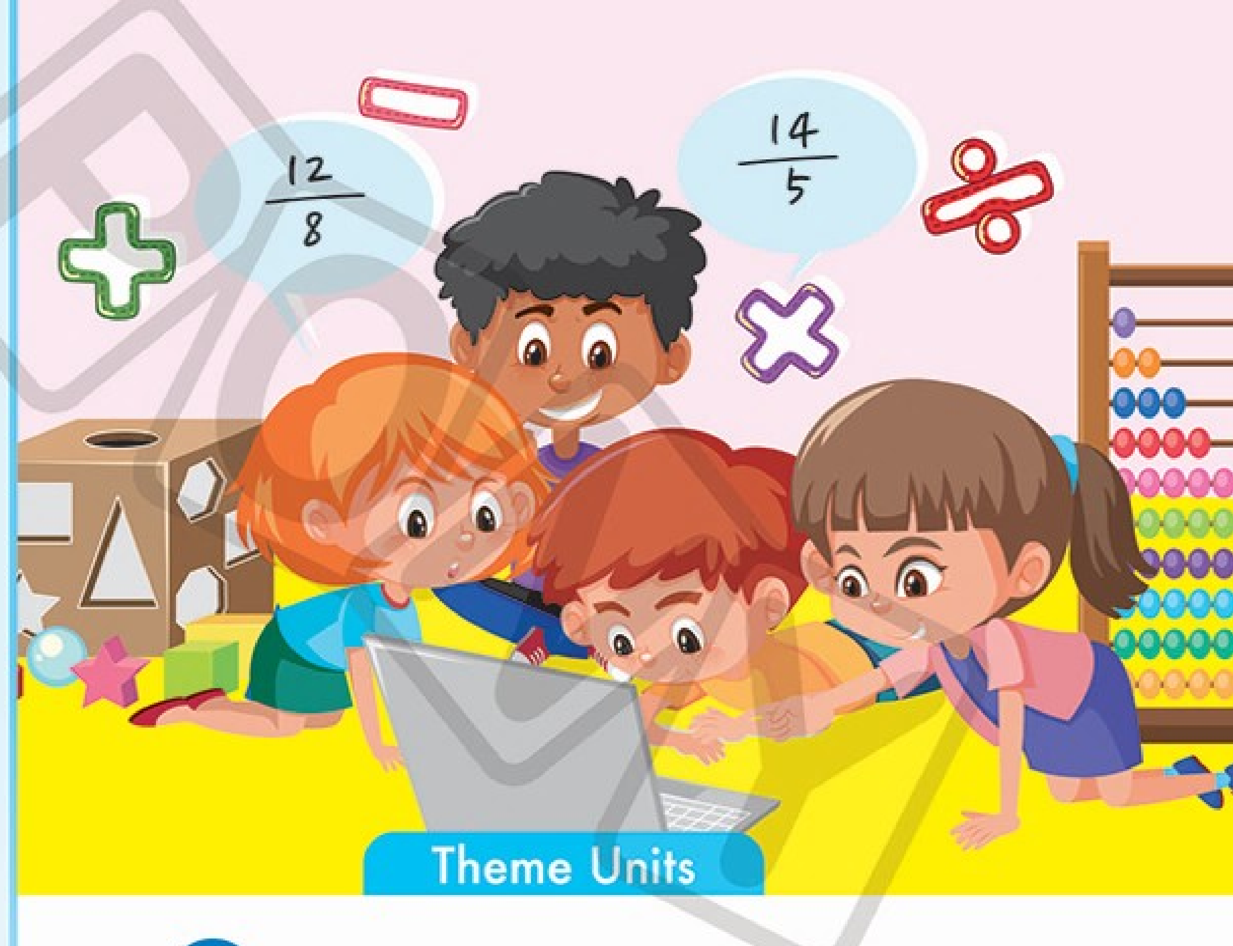
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Unit 13 Surface Area of Volume

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Theme 3

Fractions, Decimals, and Proportional Relationships



Theme Units

Unit 8 Operations on Fractions and Decimals

Concept 8.1: Multiplying and Dividing Fractions and Decimals

Unit 9 Ratio and Its Applications

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Unit 8

Operations on Fractions and Decimals

Concept 8.1 Multiplying and Dividing Fractions and Decimals

Lessons 1&2 Modeling Division with fractions and Whole Numbers Modeling Fraction Division with Tape Diagrams

Learning Objectives:

By the end of these lessons, the student will be able to:

- Use model division with fractions.
- Use tape diagrams to model dividing a fraction by fraction.

Lesson 3 Connecting Fraction Multiplication to Fraction Division

Learning Objective:

By the end of this lesson, the student will be able to:

- Develop a rule for dividing fractions.

Lesson 4 Analyzing Multiplying and Dividing Fractions and Decimals

Learning Objectives:

By the end of this lesson, the student will be able to:

- Use the standard algorithm to multiply decimals and fractions.
- Multiply by powers of 10 to make division with decimal divisors easier.

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Modeling Division with fractions and Whole Numbers
Modeling Fraction Division with Tape Diagrams

First

Use a tape diagram to divide a fraction by a whole number:

Ex. **Divide using a tape diagram.**

ⓐ $\frac{2}{3} \div 4$

1 Draw a tape diagram representing the whole one and divide it into 3 equal parts.
(According to the denominator of the fraction)

Whole one
$\frac{2}{3}$

2 Divide each part into 4 equal parts, each part representing ($\frac{1}{12}$) of the whole one.

Whole one
$\frac{2}{3}$

$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$

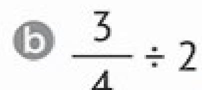
3 When dividing $\frac{2}{3}$ into 4 parts, each part (the quotient of division) is $\frac{2}{12}$

Whole one
$\frac{2}{3}$

$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$

$\frac{2}{12}$ $\frac{2}{12}$ $\frac{2}{12}$ $\frac{2}{12}$

Therefore: $\frac{2}{3} \div 4 = \frac{2}{12} = \frac{1}{6}$



ⓑ $\frac{3}{4} \div 2$

Whole one

$\frac{3}{4}$

$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$

$\frac{3}{8}$ $\frac{3}{8}$

$$\frac{3}{4} \div 2 = \frac{3}{8}$$

ⓒ $\frac{2}{5} \div 3$

Whole one

$\frac{2}{5}$

$\frac{1}{15}$	$\frac{1}{15}$	$\frac{1}{15}$	$\frac{1}{15}$	$\frac{1}{15}$	$\frac{1}{15}$	$\frac{1}{15}$	$\frac{1}{15}$	$\frac{1}{15}$	$\frac{1}{15}$	$\frac{1}{15}$	$\frac{1}{15}$	$\frac{1}{15}$	$\frac{1}{15}$	$\frac{1}{15}$

$\frac{2}{15}$ $\frac{2}{15}$ $\frac{2}{15}$

$$\frac{2}{5} \div 3 = \frac{2}{15}$$

1 Divide using the shown models:

ⓐ $\frac{3}{5} \div 2 =$ ....

ⓑ $\frac{1}{2} \div 4 =$ ....

ⓒ $\frac{2}{3} \div 3 =$ ....

ⓓ $\frac{3}{4} \div 3 =$ ....

Second

Use a tape diagram to divide a whole number by a fraction:

Ex. **Divide using a tape diagram:**

ⓐ $4 \div \frac{3}{4}$

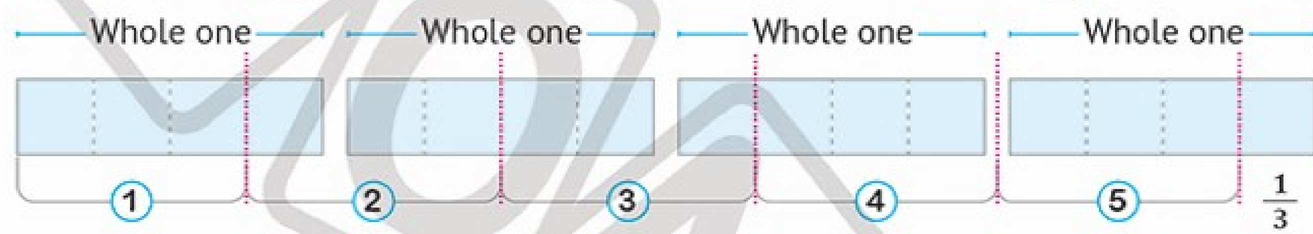
1 Draw 4 tapes, each of which represents the whole one.

Whole one Whole one Whole one Whole one

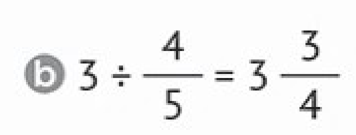
2 Divide each tape into 4 equal parts (according to the denominator of the fraction), so we have 16 parts (a quarter).

Whole one Whole one Whole one Whole one

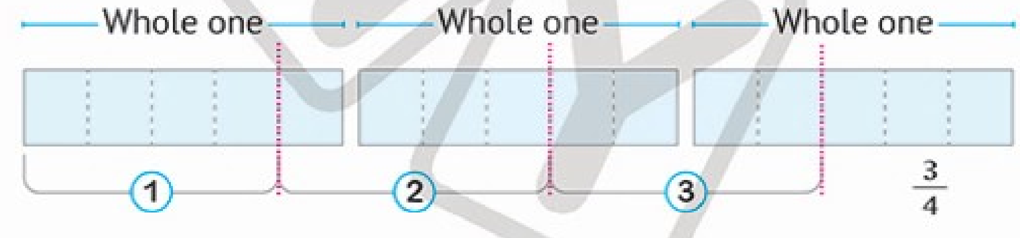
3 When dividing the 16 parts into groups, each of which has 3 parts ($\frac{3}{4}$), we get 5 groups, and one part remains. This part represents $\frac{1}{3}$ of the group.

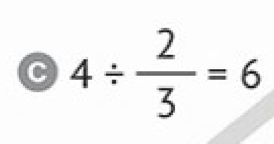


Therefore: $4 \div \frac{3}{4} = 5\frac{1}{3}$

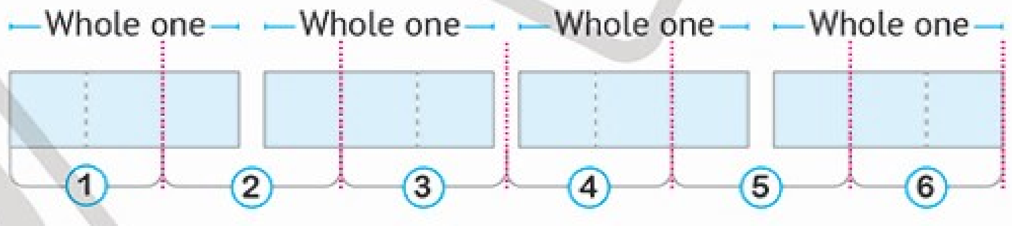


ⓑ $3 \div \frac{4}{5} = 3\frac{3}{4}$





ⓒ $4 \div \frac{2}{3} = 6$

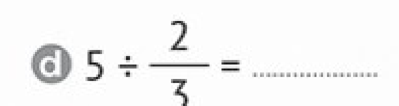


2 Divide using the shown tape diagrams:

ⓐ $2 \div \frac{5}{6} =$ ....

ⓑ $3 \div \frac{2}{5} =$ ....

ⓒ $4 \div \frac{1}{2} =$ ....



ⓓ $5 \div \frac{2}{3} =$ ....

Third

Using a tape diagram to divide a fraction by another fraction:

- When dividing a fraction by another fraction, the two fractions must be written with a common denominator, and the quotient is the result of dividing the numerator of the first fraction (the dividend) by the numerator of the second fraction (the divisor).

Ex. **Divide using a tape diagram:**

ⓐ $\frac{2}{3} \div \frac{3}{4}$

1 Draw two tapes, each of which represents the whole one

- Divide the first tape into 3 equal parts (according to the denominator of the dividend).
- Divide the second tape into 4 equal parts (according to the denominator of the divisor)

Whole one
$\frac{2}{3}$
$\frac{3}{4}$
Whole one

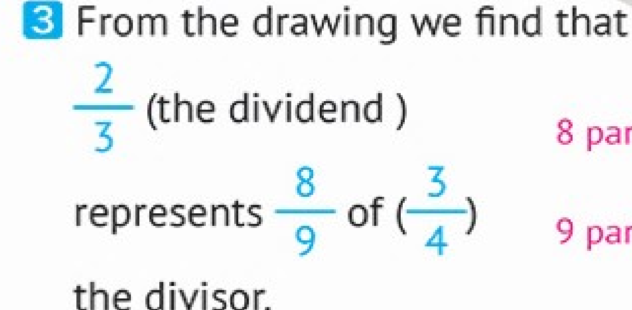
2 Re-divide each of the two tapes into 12 parts



(LCM for the two denominators)

Whole one
$\frac{2}{3} = \frac{8}{12}$
$\frac{3}{4} = \frac{9}{12}$

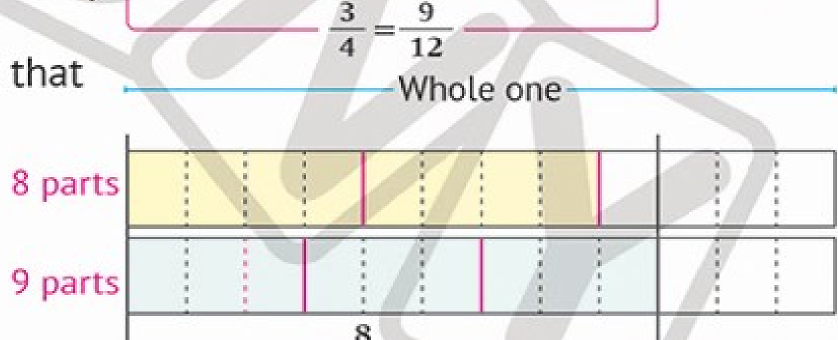
3 From the drawing we find that

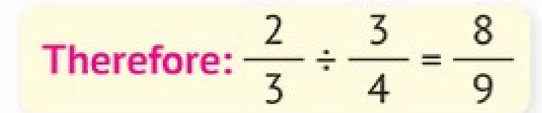


$\frac{2}{3}$ (the dividend)

represents $\frac{8}{9}$ of ($\frac{3}{4}$)

the divisor.

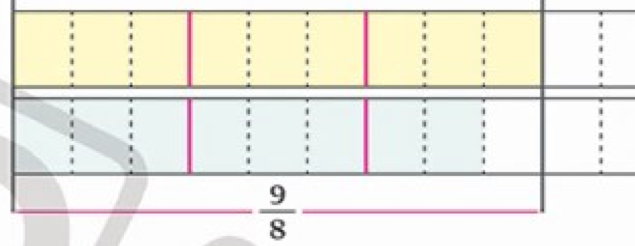




Therefore: $\frac{2}{3} \div \frac{3}{4} = \frac{8}{9}$

b $\frac{3}{4} \div \frac{2}{3} = \frac{9}{8}$

$= 1\frac{1}{8}$



c $\frac{1}{3} \div \frac{1}{2} = \frac{2}{3}$



d $\frac{1}{2} \div \frac{1}{3} = \frac{3}{2}$

$= 1\frac{1}{2}$



3 Divide using the shown models:

a $\frac{2}{3} \div \frac{1}{6} =$ ....

b $\frac{3}{5} \div \frac{1}{2} =$ ....

c $\frac{1}{4} \div \frac{1}{3} =$ ....

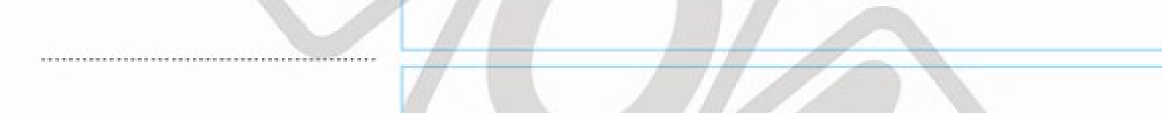
d $\frac{5}{8} \div \frac{3}{4} =$ ....

4 Use tape diagrams to answer the following questions:

a You have a 2 meter-long gift wrapping ribbon for an art project, and you need to cut it into pieces of length $\frac{2}{3}$ meter. How many pieces will you get? ....



b You have $\frac{3}{4}$ meters of chain, and you need 3 pieces of chain of equal length to make a bracelet for your friend. What is the length of each piece of chain? ....



c You have $\frac{9}{10}$ kg of clay, and you want to divide it into pieces. The mass of each piece is $\frac{2}{5}$ kg. How many pieces can you make?

....

Quiz

10

1 Complete:

a) $\frac{1}{5} \div 2 =$ ....

b) $3 \div \frac{3}{2} =$ ....

c) $\frac{2}{3} \div 3 =$ ....

d) $5 \div \frac{1}{4} =$ ....

e) $\frac{3}{7} \div \frac{1}{3} =$ ....

2 Sandy has $\frac{3}{4}$ of a big sandwich; she wants to distribute them among three of her friends. Find the share of each friend.

....

3 Murad has 4 litres of juice; he wants to divided them among his neighbors.

Each neighbor will take $\frac{2}{5}$ litre of juice.

How many neighbors will take juice?

....



Connecting Fraction Multiplication to Fraction Division



Reciprocal (reverse) Number

It is a form for the fraction of this number, in which the numerator and denominator replace each other.

Ex. **Find the reciprocal of the following numbers:**

(a) $\frac{3}{5}$ (b) $\frac{1}{4}$ (c) 8 (d) $2\frac{1}{3}$

Solution:

(a) $\frac{3}{5}$ Reciprocal $\frac{5}{3} = 1\frac{2}{3}$

(b) $\frac{1}{4}$ Reciprocal $\frac{4}{1} = 4$

(c) 8 Reciprocal $\frac{1}{8}$

(b) $2\frac{1}{3} = \frac{7}{3}$ Reciprocal $\frac{3}{7}$



Important Notes:

- If the number is in the form of an integer or a mixed number, it must first be put in the form of a improper fraction and then find the reciprocal of this number.
- There is no reciprocal of the number 0
- When any number is multiplied by its reciprocal, the result is 1.

Ex. $\frac{3}{4} \times \frac{4}{3} = 1$, $5 \times \frac{1}{5} = 1$

Standard Algorithm for Dividing Fractions:

- Rule: To find the quotient of dividing a proper fraction by another proper fraction, we multiply the dividend by the reciprocal of the divisor.

dividend ÷ divisor = dividend × Reciprocal of the divisor

$$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \times \frac{d}{c}$$

Reciprocal

Ex.

a) $\frac{3}{4} \div \frac{5}{6} = \frac{3}{4_2} \times \frac{^3 6}{5} = \frac{9}{10}$

b) $\frac{5}{8} \div \frac{1}{4} = \frac{5}{8_2} \times \frac{^1 4}{1} = \frac{5}{2} = 2\frac{1}{2}$

c) $\frac{3}{8} \div 6 = \frac{^1 3}{8} \times \frac{1}{6_2} = \frac{1}{16}$

d) $8 \div \frac{4}{5} = {}^2 8 \times \frac{5}{4_1} = 10$

e) $\frac{3}{7} \div \frac{3}{7} = \frac{^1 3}{7_1} \times \frac{^1 7}{3_1} = 1$

f) $2 \div 5 = 2 \times \frac{1}{5} = \frac{2}{5}$

1 Find the quotient in the simplest form:

a) $\frac{3}{4} \div \frac{1}{2} =$ ....

b) $\frac{2}{5} \div \frac{4}{7} =$ ....

c) $\frac{2}{9} \div \frac{2}{9} =$ ....

d) $\frac{5}{6} \div 5 =$ ....

e) $\frac{2}{5} \div 4 =$ ....

f) $6 \div \frac{3}{5} =$ ....

g) $10 \div \frac{5}{9} =$ ....



- The relationship between the operations of multiplication and division is an inverse relationship:

If: $a \times b = c$, then $c \div a = b$ and $c \div b = a$.

("a" is not equal to zero, "b" is not equal to zero)



2 Complete:

ⓐ $\frac{4}{5} \div$ .... $= \frac{4}{5} \times 3$

ⓑ .... $\div \frac{2}{3} = 5 \times$ ....

ⓒ .... $\div \frac{1}{7} = \frac{2}{5} \times$ ....

ⓓ $\frac{1}{4} \div$ .... $=$ .... $\times \frac{5}{3}$



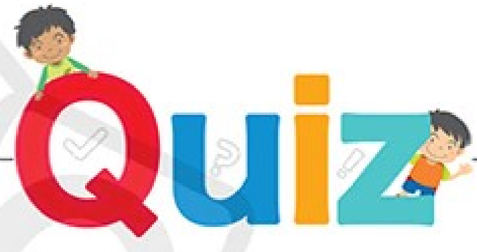
3 Alaa needs $\frac{2}{3}$ cups of flour to make a pastry dish.

If she has 4 cups of flour, how many dishes can she make?

....

4 Hana divided 3 pizza pies among a group of her friends, and each of them got $\frac{3}{5}$ of the pizza pie. How many friends does Hana have?

....



$\frac{\quad}{10}$

1 Choose the correct answer:

a) $\frac{3}{5} \times$ .... $= 1$ ($\frac{3}{5}$ or $\frac{1}{3}$ or $\frac{5}{3}$ or 1)

b) The reciprocal of $\frac{4}{7}$ is .... ($\frac{4}{7}$ or $1\frac{1}{4}$ or $\frac{7}{4}$ or $\frac{7}{2}$)

c) $\frac{2}{7} \div$ .... $= \frac{1}{3}$ ($\frac{7}{4}$ or $\frac{12}{14}$ or $\frac{14}{12}$ or $\frac{2}{6}$)

d) $\frac{2}{3} \div$ .... $= 1$ (1 or $\frac{2}{3}$ or $\frac{3}{2}$ or 0)

e) $\frac{1}{3} \times \frac{1}{3} =$ .... ($\frac{2}{3}$ or $\frac{1}{3}$ or $\frac{1}{9}$ or 1)

2 Complete:

a) $\frac{3}{7} \div \frac{9}{14} =$ ....

b) $\frac{1}{7} \div \frac{1}{8} =$ ....

c) $\frac{9}{16} \div \frac{3}{4} =$ ....

3

Gehan has 8 meters of cloth, she wants to make dresses for her daughters. If each dress takes $\frac{2}{5}$ meter of cloth, calculate how many dresses Gehan will make.

....



Analyzing Multiplying and Dividing Fractions and Decimals



First

Multiplying decimals using the standard algorithm:

1. **Multiply the two numbers without the decimal points.**
2. **Place the decimal point in the result from the right side according to the number of places that equal to the sum of the decimal places in the two numbers before multiplication.**

Ex. **Multiply (325 x 73) using standard algorithm then complete:**

a) 32.5 × 7.3 = 237.25

b) 3.25 × 7.3 = 23.725

c) 3.25 × 73 = 237.25

d) 32.5 × 73 = 2,372.5

```
    3
   1 1
   325
 ×  73
 -----
   975
+22,750
 ------
23,725
```



- If the number of digits in the product is less than the sum of the number of decimal places, we add zeros to the left of the resulting number and then put the decimal point.



a) 0.4 × 0.2 = 0.08

b) 0.04 × 0.2 = 0.008

c) 0.4 × 0.02 = 0.008

d) 0.04 × 0.02 = 0.0008

Theme 3

1 Multiply (24 x 13) using the standard algorithm, then complete:

a) 2.4 × 13 = ...
b) 24 × 1.3 = ...
c) 2.4 × 1.3 = ...
d) 0.24 × 1.3 = ...
e) 2.4 × 0.13 = ...
f) 2.4 × 130 = ...
g) 0.24 × 13 = ...
h) 0.24 × 0.13 = ...

$$\begin{array}{r} 24 \\ \times \quad 13 \\ \hline \ldots\ldots \\ + \ \ldots\ldots \\ \hline \ldots\ldots \end{array}$$

2 Use the standard algorithm to find the product:

a)
$$\begin{array}{r} 3.56 \\ \times \quad 0.02 \\ \hline \ldots\ldots \end{array}$$

b)
$$\begin{array}{r} 2.369 \\ \times \quad 0.34 \\ \hline \ldots\ldots \\ + \ \ldots\ldots \\ \hline \ldots\ldots \end{array}$$

c)
$$\begin{array}{r} 56.32 \\ \times \quad 1.3 \\ \hline \ldots\ldots \\ + \ \ldots\ldots \\ \hline \ldots\ldots \end{array}$$

d)
$$\begin{array}{r} 2.036 \\ \times \quad 2.5 \\ \hline \ldots\ldots \\ + \ \ldots\ldots \\ \hline \ldots\ldots \end{array}$$

3 If the price of one kilogram of apples is 40.50 pounds. What is the price of 1.5 kg?

....

Second

Dividing decimal using the standard algorithm:

- When dividing decimal, the divisor must always be an integer.

1 Convert the divisor into a whole number (if it is a decimal) by multiplying by 10 , 100 , 1,000 , or .... (according to the number of decimal places)

2 Multiply the dividend by the same number by which the divisor was multiplied.

3 Perform division.

Ex.

a) $3 \div 0.5 = 30 \div 5 = 6$ (×10, ×10)

b) $0.024 \div 0.06 = 2.4 \div 6 = 0.4$ (×100, ×100)

c) $5 \div 0.05 = 500 \div 5 = 100$ (×100, ×100)

d) $2.6 \div 0.26 = 260 \div 26 = 10$ (×100, ×100)

4 Divide:

a) $4 \div 0.2 =$ .... $\div$ .... $=$ ....

b) $18 \div 0.09 =$ .... $\div$ .... $=$ ....

c) $1.5 \div 0.3 =$ .... $\div$ .... $=$ ....

d) $2 \div 0.25 =$ .... $\div$ .... $=$ ....

Ex. **Use the standard algorithm to find the quotient:**

a) $273.6 \div 8 = 34.15$

```
      034.2
   ________
8 |  273.6
   - 24
   ------
      33
   -  32
   ------
       16
   -   16
   ------
       00
```

b) $17.01 \div 0.7 = 24.3$

× 10, × 10

$170.1 \div 7$

```
      024.3
   ________
7 |  170.1
   - 14
   ------
      30
   -  28
   ------
       21
   -   21
   ------
       00
```

c) $8.4 \div 0.24 = 35$

× 100, × 100

$840 \div 24$

```
       035
    _______
24 |  840
   -  72
   ------
      120
   -  120
   ------
      000
```

d) $97 \div 4 = 24.25$

```
      24.25
   ________
4 |  97.00
   - 8
   ------
     17
   - 16
   ------
      10
   -   8
   ------
      20
   -  20
   ------
      00
```

5 Use the standard algorithm to find the quotient:

a) $5.7 \div 3 =$ ....

b) $9.8 \div 0.07 =$ ....

c) $1.32 \div 1.2 =$ ....

d) $810 \div 2.7 =$ ....

e) $2.25 \div 1.5 =$ ....

f) $25.6 \div 0.08 =$ ....

6 A father divided 99 pounds equally among his 5 children. How many pounds does each son take?

....



/ 10

1 Complete:

a) 21.222 ÷ 0.9 = ...

b) 1.44 ÷ 1.2 = ...

c) 3.25 × 0.5 = ...

d) 0.72 ÷ 0.08 = ...

e) 0.07 × 0.14 = ...

2 Use the standard algorithm to find the quotient:

a) 6.5152 ÷ 0.32 = ...

b) 873.2 ÷ 3.7 = ...

c) 240.5 ÷ 0.74 = ...

3 Farida bought 18 cans of soda, the price of each can is 8.75 LE.

How much money did she pay?

....



Ratio and Its Applications

Concept 9.1 Understand Ratio

Lesson 1 Exploring Ratio and Rate with Real-Life Situations

Learning Objectives:

By the end of this lesson, the student will be able to:

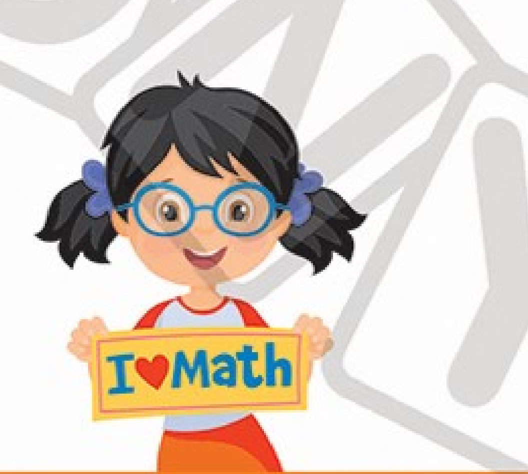
- Discover the meaning of ratio.
- Write the ratio in different forms.

Lessons 2&3 Representing Ratio Exploring Equivalent Ratios

Learning Objectives:

By the end of these lessons, the student will be able to:

- Use ratio to extend patterns.
- Use ratio to investigate real-world relationships.





Exploring Ratio and Rate with Real-Life Situations

Ratio

It is comparing two quantities of the same type (weights, lengths, areas, etc.). By determining the existing number of one quantity to a given number of the other quantity.

The ratio between two numbers:

- a and b can be expressed as the following:

a to b (or) $\frac{a}{b}$ (or) a : b

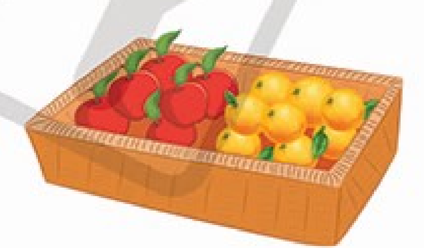


- The numbers a and b are called ((terms of the ratio)).
- The ratio has the same properties as the fraction in terms of simplification and comparison.
- The order of the terms of the ratio must be considered when expressing the ratio ($a : b \neq b : a$)
- The ratio between two numbers = $\frac{\text{The first number}}{\text{The second number}}$

Types of Ratios

- Ratios between a part and a part
- Ratios between a part and a whole

Ex. **There are 6 apples and 8 oranges in a basket. To compare the numbers of fruits in the basket:**



First: Comparisons That Are Ratios

The ratio between a part and a part

1 **The ratio of the number of apples to the number of oranges.**

Number of apples		Number of oranges
6	to	8
6	:	8

$\frac{6}{8} = \frac{3}{4}$ (Simplifying)

That means

the number of apples = $\frac{3}{4}$ the number of oranges

For every 3 apples there are 4 oranges.

2 **The ratio of the number of oranges to the number of apples.**

Number of oranges		Number of apples
8	to	6
8	:	6



$\frac{8}{6} = \frac{4}{3}$ (Simplifying)

That means

the number of oranges= $\frac{4}{3}$ the number of apples

For every 4 oranges there are 3 apples.

The ratio between part and whole

1 **The ratio of the number of apples to the total number of fruits.**

The Number of apples		The total number of fruits
6	to	14
6	:	14

$\frac{6}{14} = \frac{3}{7}$ (Simplifying)

That means

Number of apples = $\frac{3}{7}$ total number of fruits For every 7 fruits, 3 of them are apples.

2 **The ratio of the number of oranges to the total number of fruits.**

The Number of oranges		The total number of fruits
8	to	14
8	:	14

$\frac{8}{14} = \frac{4}{7}$ (Simplifying)

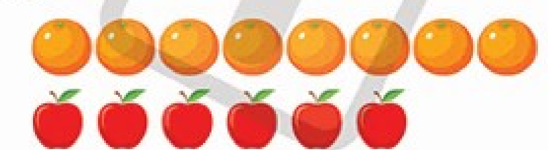
That means

Number of oranges = $\frac{4}{7}$ total number of fruits

For every 7 fruits, 4 of them are oranges.

Second: Comparisons That Are Not Ratios

- There are two more oranges than apples
- The number of apples is two fewer than the number of oranges.



1 **Determine whether the following comparisons are ratios or not:**

	Comparison	Is a Ratio	Is not a Ratio
a	There are six students who like art compared to five students who like mathematics.		
b	Seven more students like art than math.		
c	Seven out of twenty-eight students like adventure movies.		
d	Five more students prefer fantasy than drama.		
e	For every student who likes science, two students like math.		

2 **A class has 18 girls and 24 boys. Complete in the simplest form the ratio between:**

ⓐ The number of girls and the number of boys:

.... : ....

$\frac{......}{......} = \frac{......}{......}$

Number of girls = $\frac{......}{......}$ Number of boys.

ⓑ The number of boys and the number of girls:

.... : ....

$\frac{......}{......} = \frac{......}{......}$

Number of boys = $\frac{......}{......}$ Number of girls.

ⓒ The number of girls and the number of class students:

.... : ....

$\frac{......}{......} = \frac{......}{......}$

Number of girls

= $\frac{......}{......}$ Number of class students

ⓓ The number of boys and the number of class students:

.... : ....

$\frac{......}{......} = \frac{......}{......}$

Number of boys

= $\frac{......}{......}$ Number of class students

ⓔ The number of girls is .... (less - more) than the number of boys by ....

3 **Ahmed had 36 pounds, of which he spent 27 pounds. What is the ratio between what is left with Ahmed and what he spent?**

....

....

Ex. **Find the ratio between each of the following in the simplest form:**

ⓐ 32 : 48

÷ 8

4 : 6

÷ 2

2 : 3

(÷ 16)

ⓑ 28 : 42

÷ 7

4 : 6

÷ 2

2 : 3

(÷ 14)

4 **Find the ratio between each of the following in the simplest form:**

(a) 22 : 66

....

....

(b) 96 : 63

....

....

(c) 48 : 72

....

....

Remember that

- Perimeter of square = Side length x 4

The ratio between the side length of a square to its perimeter is 1:4 or $\frac{1}{4}$

The ratio between the perimeter of a square to its side length is 4:1 or $\frac{4}{1} = 4$

The ratio between the lengths of two sides of a square is 1:1 or $\frac{1}{1} = 1$

The ratio of the side length of an equilateral triangle to its perimeter is 1:3 or $\frac{1}{3}$

The ratio of the perimeter of an equilateral triangle to its side length is 3:1 or $\frac{3}{1} = 3$

Rate

- It is a comparison (ratio) between two quantities that have different units.
- Rate language often uses the words per and for every to describe the relationship.

Ex. of Rate:

- The car consumes 18 liters of fuel per kilometer. (18 liters /km)
- Fouad reads 120 words for every minute. (120 words/min)
- The speed of a computer printer is 20 pages per minute. (20 pages/a minute)
- It takes 6 eggs for every kilogram of flour to make a cake. (6 eggs/kg)

Ex. **Ahmed studies 28 hours a week. Find Ahmed's daily study rate.**

Answer Daily study rate: 28 ÷ 7 = 4 hours/day



Ahmed's daily study rate can be expressed in different ways, including:

- The number of hours of study compared to the number of days is 4 to 1.
- Ahmed studies 4 hours per day.
- The ratio of the number of days and hours of study is $\frac{1}{4}$.

5 Answer the following:

ⓐ Ahmed spends 840 pounds a week. What is his daily spending rate?

....

ⓑ The car consumes 40 liters to travel 320 kilometers.

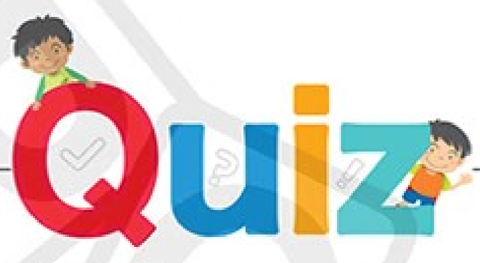
What is the fuel consumption rate of the car?

....

ⓒ Laila writes 640 words in 16 minutes using the computer.

Calculate the rate of Laila's typing on the computer.

....



10

1 Choose the correct answer:

a) A runner covers 110m in 10 seconds, then his rate of covering is .... m/sec. (11 or 10 or 1.1 or 110)

b) The ratio between 32:48 (in the simplest form)is .... : .... (2:3 or 2:5 or 3:4 or 1:2)

c) 15:20 = ... : .... (2:3 or 2:5 or 3:4 or 1:2)

2 Complete:

a) $4:6 = \frac{\dots}{3}$

b) The ratio between the perimeter of an equilateral triangle to its side length is .... : ....

c) If Gehan drinks 21 glasses of milk weekly, then the rate of what she drinks daily is .... glasses / day.

d) An oven uses 15 litres of fuel every 3 hours, then the rate of the used fuel = ... litre/hour.

3 A factory produces 7,200 bottles of soda in 8 hours.

What is the rate of production?

....



Representing Ratio
Exploring Equivalent Ratios

Equivalent Ratios

Two ratios are equivalent (equal). If both quantities in the first ratio can be multiplied or divided by the same number except zero, the result is equal to the two corresponding quantities in the second ratio.

Ex.

ⓐ The ratios $\frac{8}{24}$ and $\frac{15}{45}$

When we put them in the simplest form we find:

$\frac{8}{24} = \frac{1}{3}$, $\frac{15}{45} = \frac{1}{3}$

So, $\frac{8}{24} = \frac{15}{45}$ are two equivalent ratios

ⓑ The ratios $\frac{9}{21}$ and $\frac{16}{32}$

When we put them in the simplest form we find:

$\frac{9}{21} = \frac{3}{7}$, $\frac{16}{32} = \frac{1}{2}$

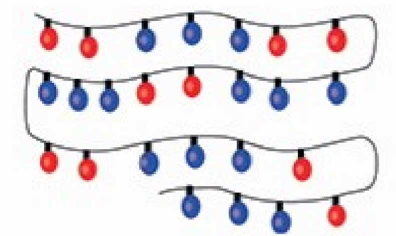
So, $\frac{9}{21} \neq \frac{16}{32}$ (not equivalent ratios)

1 **Put each of the following ratios in its simplest form, then match the equivalent ratios:**

ⓐ $\frac{10}{35}$ ⓑ $\frac{15}{27}$ ⓒ $\frac{14}{28}$ ⓓ $\frac{12}{27}$

1 $\frac{12}{24}$ 2 $\frac{8}{28}$ 3 $\frac{16}{36}$ 4 $\frac{25}{45}$

Ex. A string of colored lights is used to decorate a party. This string consists of 2 red lights and 3 blue lights.



The following table shows the total number of lamps.

Total Number of Lamps	5	10	15	20	25
Number of Red Lights	2	4	6	8	10
Number of Blue Lights	3	6	9	12	15

From the previous table, we note that the ratios are equivalent.

$$\frac{2}{3} = \frac{4}{6} = \frac{6}{9} = \frac{8}{12} = \frac{10}{15}$$

The ratio of the number of red lights to the number of blue lights is always $\frac{2}{3}$.

2 Wild rabbits usually live and feed on green grass in an area. Scientists have determined that for every 2 square kilometers of land, there are approximately 7 wild rabbits.

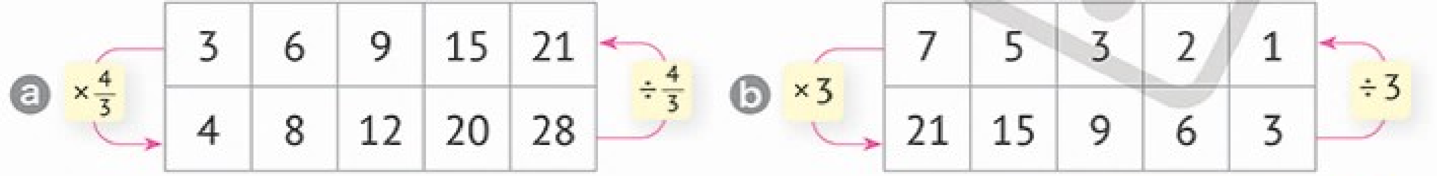
Complete the following table:

Land Area (sq km)	2	6	....	....
Number of Rabbits	....	....	35	70

The equivalent ratios can be placed in a ratio table, as in the following example.



Ex.



(a) $\times \frac{4}{3}$, $\div \frac{4}{3}$

3	6	9	15	21
4	8	12	20	28

(b) $\times 3$, $\div 3$

7	5	3	2	1
21	15	9	6	3

3 Complete the following ratio tables:

a) × ...... / ÷ ......

32	....	20	....	4
....	30	....	15	5

b) × ...... / ÷ ......

1	2	....	7	....
2	....	10	....	18

4 In a juice shop, 2 kilograms of guava were squeezed to produce 6 cups of guava juice to customers. (Complete the following table):

a) If 5 kilograms of guava are squeezed, how many cups can be served to customers?

....

× ...... / ÷ ......

Guava Weight	2	5	....
Number of Cups of Juice	6	....	27

b) How many kilograms of guava are needed to serve 27 cups of juice to customers?

....

5 A car consumes 10 liters of gasoline to travel 60 km. Complete the following table:

a) What is the distance the car travels using 2 liters of gasoline?

....

× ...... / ÷ ......

Distance Traveled	60	....	180
Number of Liters	10	2	....

b) How many liters does a car consume to cover a distance of 180 km?

....



/ 10

1 Match the equivalent ratios:

ⓐ 68 : 48 ⓑ 18 : 54 ⓒ 63 : 14 ⓓ 3200 : 4800

1 72 : 16 2 30 : 45 3 85 : 60 4 25 : 75

2 A computer colored printer prints 12 paper for every 3 minutes.

ⓐ Complete the following table:

× ...... ÷ ......

Paper	36	60	....	240
Minutes	9	....	12	....

ⓑ How many papers will be printed in 4.5 minutes?

....

ⓒ How long the printer will take to print 160 papers?

....



Ratio and Its Applications

Concept 9.2 Create Equivalent Ratios

Lessons 4&5 Representing Ratios with Tape Diagrams / Analyzing Equivalent Ratios with a Number Line

Learning Objectives:

By the end of these lessons, the student will be able to:

- Model ratios using tape diagrams.
- Solve problems that involve equivalent ratios.
- Find equivalent ratios using double number line diagrams.

Lesson 6 Comparing and Analyzing Ratios

Learning Objective:

By the end of this lesson, the student will be able to:

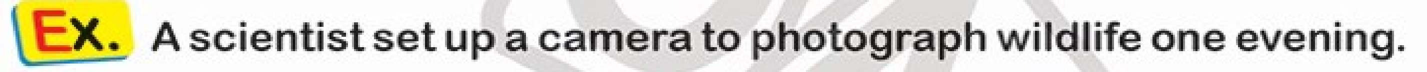
- Determine whether the ratios are equivalent.





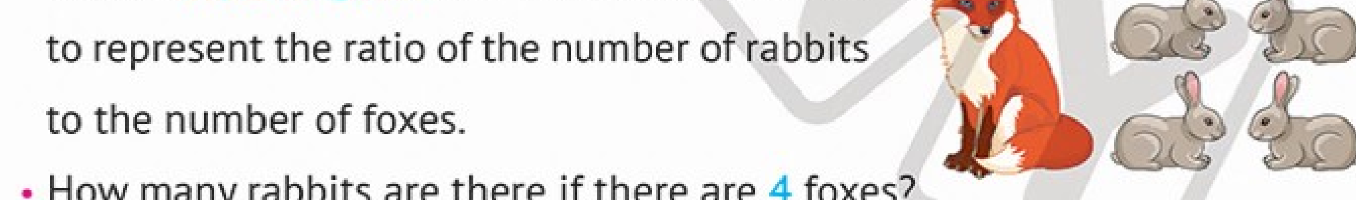
Representing Ratios with Tape Diagrams
Analyzing Equivalent Ratios with a Number Line

First: Representing ratios with tape diagram



Ex. **A scientist set up a camera to photograph wildlife one evening.**

1- If the camera recorded 4 rabbits and 1 fox.



- Draw a tape diagram and write numbers on it to represent the ratio of the number of rabbits to the number of foxes.
- How many rabbits are there if there are 4 foxes?

2- The ratio is represented by two tapes divided into equal parts.

- The first tape is divided into 4 parts, each representing a rabbit.

Rabbits	1	1	1	1
Foxes	1			

- The second tape consists of a part representing a fox.
- If the number of foxes is 3, then the number of rabbits $= 3 \times 4 = 12$ rabbits.

Rabbits	3	3	3	3
Foxes	3			

1 **If 1 kg of orange is enough to make 3 cups of juice.**

ⓐ Draw a tape diagram and write numbers on it to represent the ratio of the weight of oranges to the number of cups of juice?

....

ⓑ How many cups of juice can be made from 5 kg of oranges?

....

ⓒ How many kilograms of oranges are needed to make 27 cups of juice?

....

Theme 3

2 **Draw a tape diagram and write numbers on it to represent the ratio 3:6, then complete the following table:**

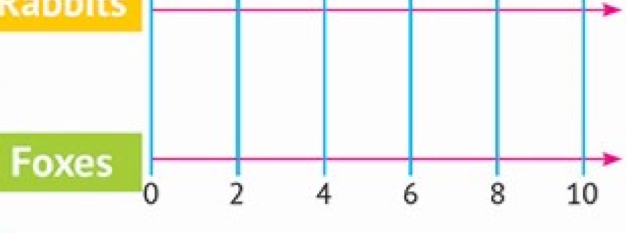
....	....	3	4	5
2	4	6	....	....

Second: Analyzing equivalent ratios using a double number line

Ex. **If the camera recorded 3 rabbits and 2 foxes.**
Sketch a double number line to compare the numbers of rabbits and the numbers of foxes, then from the drawing, complete the table shown:

- The ratio is represented by two number lines.

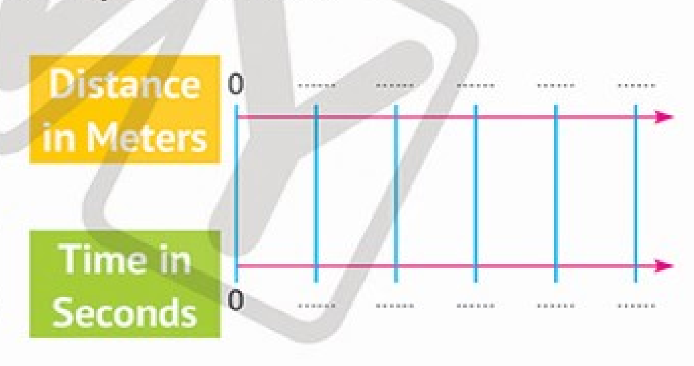
- The first number line represents rabbits in a pattern that increases by 3.
- The second number line represents foxes with a pattern that increases by 2.



Number of Rabbits	3	6	9	12	15
Number of Foxes	2	4	6	8	10

3 **If the speed of the fox is 6.5 meters per second.**

ⓐ Sketch a double number line and write the numbers to compare the distance in meters that the fox runs and the time in seconds that it takes to run.



ⓑ What distance does a fox cover in 4 seconds?

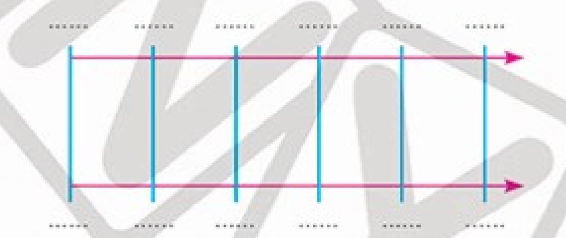
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ⓒ How long does it take a fox to cover 32.5 metres?

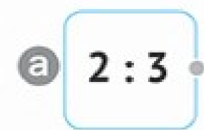
....

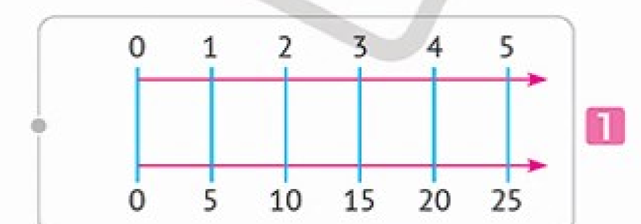
4 **Sketch a double number line and write the numbers to represent the ratio 5:8, then complete the following table:**

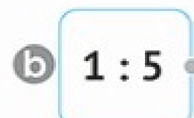
5	10	15	....
8	....	....	32

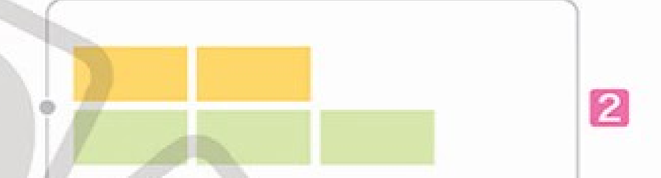


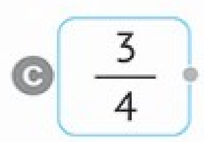
5 **Match each ratio with the appropriate diagram:**

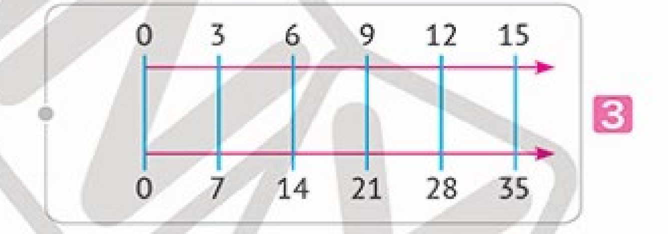


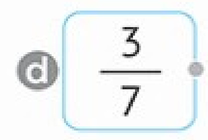




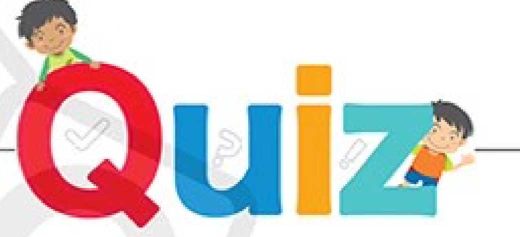






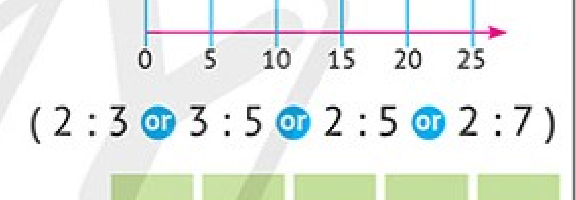






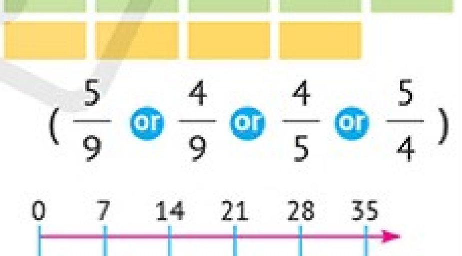
$\frac{}{10}$

1 Choose the correct answer:



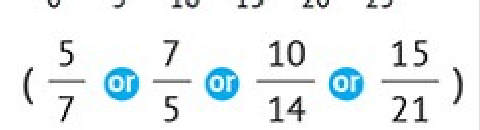
a. The ratio representing the opposite tape diagram is ....

(3 : 4 or 3 : 7 or 4 : 7 or 1 : 4)



b. The ratio representing the opposite double line number is ....

(2 : 3 or 3 : 5 or 2 : 5 or 2 : 7)



c. The ratio representing the opposite tape diagram is ....

($\frac{5}{9}$ or $\frac{4}{9}$ or $\frac{4}{5}$ or $\frac{5}{4}$)

d. The ratio representing the opposite double line number is ....

0 7 14 21 28 35

0 5 10 15 20 25

($\frac{5}{7}$ or $\frac{7}{5}$ or $\frac{10}{14}$ or $\frac{15}{21}$)

2 Draw a tape diagram and write numbers on it to represent the ratio 1:5, then complete the following table?

1	2	3	....
5	....	....	20

3 Sketch a double number line and write the numbers to represent the ratio $\frac{3}{4}$, then complete the following table:

3	6	9	....
4	....	....	16



Lesson 6 Comparing and Analyzing Ratios

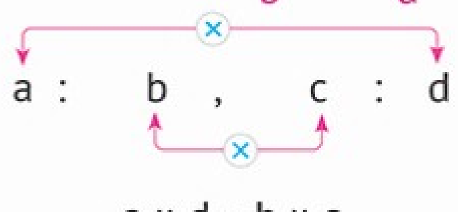
Methods for determining equivalent ratios

1 Simplification:

- Two ratios are equivalent if they are equal when put in their simplest form.

2 Cross Multiplication:

- The two ratios $\frac{a}{b}$ and $\frac{c}{d}$ are equivalent if:



$a : b \quad , \quad c : d$

$a \times d = b \times c$

$\frac{a}{b} , \frac{c}{d}$

$a \times d = b \times c$

where a, b, c, d are positive numbers

Ex. **Determine whether each of the following ratios is equivalent or not:**

ⓐ $3 : 9 , 2 : 6$

1 Simplification:

$3 : 9 = 1 : 3$ (dividing by 3)

$2 : 6 = 1 : 3$ (dividing by 2)

2 Cross Multiplication:

$3 \times 6 = 18 \quad , \quad 9 \times 2 = 18$

That is, $3 : 9 = 2 : 6$ (two equivalent ratios)

ⓑ $\frac{5}{10} , \frac{8}{12}$

1 Simplification:

$\frac{5}{10} = \frac{1}{2} \quad , \quad \frac{8}{12} = \frac{2}{3}$

2 Cross Multiplication:

$5 \times 12 = 60 \quad , \quad 10 \times 8 = 80$

That is: $\frac{5}{10} \neq \frac{8}{12}$ (Not equivalent)

1 Put each of the following ratios into their simplest forms, then determine whether they are equivalent or not:

ⓐ 3 : 6 , 5 : 10

....
....
....

ⓑ $\frac{6}{9}$, $\frac{7}{14}$

....
....
....

ⓒ $\frac{8}{10}$, $\frac{6}{15}$

....
....
....

2 Using cross multiplication, determine whether they are equivalent or unequal:

ⓐ 1 : 2 , 3 : 4

....
....
....

ⓑ $\frac{8}{10}$, $\frac{12}{15}$

....
....
....

ⓒ 2 : 6 , 5 : 15

....
....
....

Solving for Missing Value

Ex. Find the value of x in each of the following:

ⓐ $x : 6 = 5 : 10$

$\frac{x}{6} = \frac{5}{10}$

$x = \frac{6 \times 5}{10} = 3$

ⓑ $6 : x = 2 : 3$

$\frac{6}{x} = \frac{2}{3}$

$x = \frac{6 \times 3}{2} = 9$

ⓒ $\frac{6}{8} = \frac{x}{12}$

$\frac{6}{8} = \frac{x}{12}$

$x = \frac{6 \times 12}{8} = 9$

ⓓ $\frac{4}{20} = \frac{3}{x}$

$\frac{4}{20} = \frac{3}{x}$

$x = \frac{20 \times 3}{4} = 15$

3 Find the value of x in each of the following:

ⓐ $x : 4 = 2 : 8$

$\frac{\dots}{\dots} = \frac{\dots}{\dots}$

$x = \frac{\dots \times \dots}{\dots} = \dots$

ⓑ $4 : x = 2 : 6$

$\frac{\dots}{\dots} = \frac{\dots}{\dots}$

$x = \frac{\dots \times \dots}{\dots} = \dots$

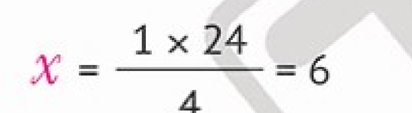
ⓒ $\frac{2}{3} = \frac{x}{9}$

$x = \frac{\dots \times \dots}{\dots} = \dots$

ⓓ $\frac{5}{15} = \frac{2}{x}$

$x = \frac{\dots \times \dots}{\dots} = \dots$

4 Complete the following table to form equivalent ratios:



$x = \frac{1 \times 24}{4} = 6$

x	3	1	z	4
24	y	4	20	l

(a) $y = \frac{\ldots \times \ldots}{\ldots} = \ldots$

(b) $z = \frac{\ldots \times \ldots}{\ldots} = \ldots$

(c) $l = \frac{\ldots \times \ldots}{\ldots} = \ldots$

5 Identify all of the ratios that are equivalent to the ratio of 8 : 12:

(a) 6 : 10	(b) 12 : 18	(c) 2 : 3	(d) 12 : 8	(e) 6 : 9

6 Tarek and Hashem each made a batch of paint in the Paint Mixer.

Hashem's batch was in the ratio 4 red : 6 yellow. Tarek wants to have the same color as Hashem, so he used a ratio of 6 red : 9 yellow.

Are their paint batches the same color? Explain how you know.



....

....



10

1 Choose the correct answer:

a) If a: 6 = 2 : 4, then 4 a = ... (12 or 24 or 8 or 10)

b) If a: b and c: d are equivalent ratios then ....

(a × b = c X d or a × c = b × d or a × d = b × c or a + d = b + c)

c) The ratio $\frac{6}{8}$ is equivalent to the ratio .... ($\frac{3}{8}$ or $\frac{6}{4}$ or $\frac{4}{3}$ or $\frac{3}{4}$)

d) .... are two equivalent ratios

($\frac{1}{2}$, $\frac{1}{3}$ or $\frac{5}{13}$, $\frac{5}{11}$ or $\frac{1}{2}$, $\frac{5}{10}$ or $\frac{1}{6}$, $\frac{1}{7}$)

2 Find the value of missing in the following ratio table

2	4	6	c	d
a	b	9	15	24

a) a = ...
b) b = ...
c) c = ...
d) d = ...

3 A tree is 5 meters high and its shadow is 10 meters long at a moment. How tall is a student whose shadow is 3 meters long at the same moment?

Note: The ratio between the height of the tree and the height of the student is equivalent to the ratio between their shadows at the same moment.

....

....

Unit 10 Unit Rate and Percent



Lessons 1-3 The Unit Rate

Learning Objectives:

By the end of these lessons, the student will be able to:

- Develop a definition of the unit rate.
- Explore how to use the unit rate to solve problems.
- Use a variety of models, including tape diagram number lines and ratio tables to determine the unit rate.
- Make predictions using the unit rate.
- Use the unit rate to determine the best buys for a product.
- Apply the unit rate to solve real-life problems.





The Unit Rate

Unit Rate

It is a rate that compares the number of units of one quantity with one unit of the second quantity.

Ex. of rate:

Unit Rate	Not a Unit Rate
Car speed: 80 kilometers per hour	Car speed: 320 kilometers in 4 hours
Sugar price: 45 pounds per kilogram	Sugar price: 135 pounds per 3 kilograms
Number of playing cards: 7 cards for each player	Number of playing cards: 35 cards for every 5 players
Number of football players: 11 players in each team	Number of football players: 66 players in 6 teams

1 **Explain which of the following is a unit rate and which is not a unit rate:**

	Rate	Unit Rate	Not a Unit Rate
a	The car's fuel consumption rate is 8 liters per 100 km		
b	Add two cups of flour for every 3 eggs.		
c	The price of one book is 8 pounds.		
d	Adel covers 5 kilometers on his bike in one hour.		
e	Each package of sugar contains 5 kilograms.		

Methods of Finding the Unit Rate

First: Find the Unit Rate

- The ratio $\frac{a}{b}$ if $a \neq 0$ and $b \neq 0$ can be expressed as:

  - The unit rate $a \div b$ of units, **which represents** the amount of a for each unit of b.

  Or - The unit rate $b \div a$ of units, **which represents** the amount of b for each unit of a.

Ex. **A box of tomatoes weighing 20 kilograms is sold for 80 pounds:**

Write two different unit rates to represent this situation.

1. Unit rate in kilograms per pound:

   $20 \div 80 = 0.25$ kg per pound



2. Unit rate in pounds per kilogram:

   $80 \div 20 = 4$ pounds per kg



2 **Yassin covers 25 kilometers in 5 hours on his bike.**

Write two different unit rates to represent this situation.

1. Unit rate in kilometers per hour:

   ....

2. Unit rate in hours per kilometer:

   ....



3 **It takes 2 kilograms of flour to make 25 loaves of bread.**

Write two different unit rates to represent this situation.

1. Unit rate in kilograms per a loaf of bread:

   ....

2. Unit rate in loaves of bread per kilogram:

   ....



Theme 3

Second: Finding the Unit Rate Using (bar chart - double number line - ratio tables)

Ex. **A racing car continued to travel at a rate of 14 kilometers per 4 minutes.**

Find the unit rate that expresses the car's speed (in kilometers per minute)

1 Tape Diagram:

Draw two tapes;

- The first tape represents the distance in kilometers.
- The second tape represents the time in minutes.
  - Divide the second tape into 4 parts, each of which represents one minute.
  - Divide the first tape also into 4 parts, like the secand tape, each part representing 3.5 kilometers (14 ÷ 4 = 3.5).
  - From the tape diagram:

14 kilometers

3.5	3.5	3.5	3.5
1	1	1	1

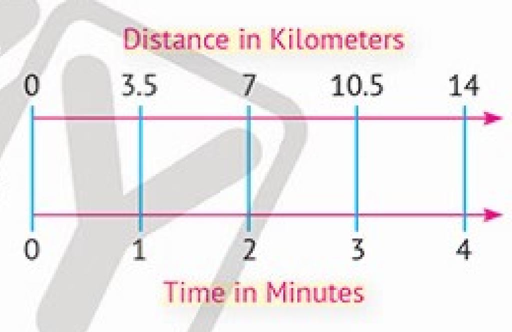
4 minutes

The unit rate of the car's speed is 3.5 km/min

2 Double Number Line:

Draw two number lines,

- The first number line represents the distance in kilometers.
- The second number line represents the time in minutes.
  - Divide the second number line into 4 parts, each of which represents one minute.
  - Divide the first number line also into 4 parts, each of which represents 3.5 kilometers (14 ÷ 4 = 3.5).



From the double number line:

The unit rate of the car's speed is 3.5 km/min

3 Completing the Ratio Table:

- Complete the following table of ratios and find the unit rate.

Distance in Kilometers	3.5	7	10.5	14
Time in Minutes	1	2	3	4

From the previous table:

The unit rate that expresses the car's speed is (3.5 km/min)

4 **A family consumes 4 kg of sugar in 16 days.**

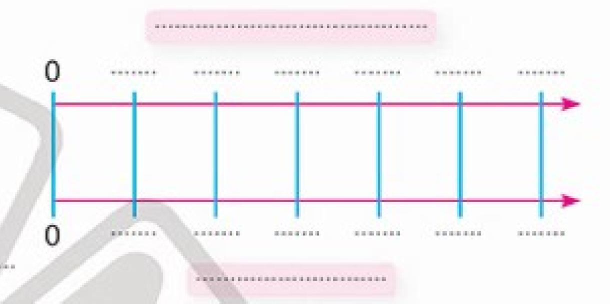
Using the corresponding tape diagram, find the daily rate of the family's consumption of sugar.

....

....

5 **Basma participated in a rope jumping competition and achieved 570 jumps in 6 minutes.**

Using the opposite double number line, find the unit rate of Basma's jumps (the number of jumps per minute).



....

....

6 **If 5 tons of organic fertilizer are used to fertilize 10 feddans, Complete the following ratio table, then find the fertilization rate per acre.**

Fertilizer Weight in Tons	....	....	....	....	5
Land area in Feddans	....	....	....	....	10

....

Ex. **The cinema offers three sizes of popcorn packages, as shown in the following table. Which of the sizes represents the best buy?**

Size	Number of Cups	Cost (LE)
Small	7	70
Medium	10	80
Large	20	100

Answer

To answer, you must find the unit rates for each of the sizes:

Size	Number of Cups	Cost (LE)	Unit Rate	
			Pounds per cup	Number of Cups per Pound
Small	7	70	70 ÷ 7 = 10	7 ÷ 70 = 0.1
Medium	10	80	80 ÷ 10 = 8	10 ÷ 80 = 0.125
Large	20	100	100 ÷ 20 = 5	5 ÷ 100 = 0.2

The best choice is the large size because It represents:

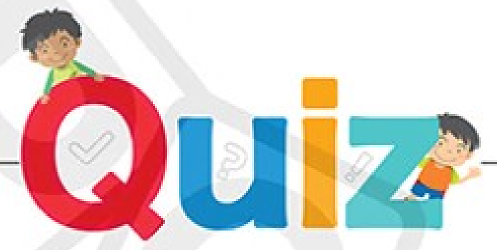
the lowest price per package **and** the largest number of cups per pound

7 **During the sales season, a ready-made clothing store announced three offers for selling clothing.**

Complete the following table, then decide which offer is the best:

Offer	Number of Pieces	Price(in Pounds)	Rate (LE per Piece)
First	5	625	....
Second	8	960	....
Third	10	1,000	....

The best choice is the .... offer, because it represents ....



/ 10

1 Find the unit rate of the following:

a) Fourteen oranges in two boxes ⟶ The unit rate: ....

b) Twelve campers in two tents ⟶ The unit rate: ....

c) 15 backpacks for 5 children ⟶ The unit rate: ....

2 Find the unit rate of the following:

a) Ahmed spends 240 pounds every 10 days, then the rate of what he spends daily is .... pounds/day. (22 or 23 or 24 or 28)

b) Hossam studies 42 hours weekly, then the rate of what he studies daily is .... hours/day. (6 or 7 or 8 or 9)

c) A motorcycle covers 160 km in 4 hours, then the rate of speed of the motorcycle is .... km/hr. (100 or 80 or 60 or 40)

3 Amr drove 180 km in 2 hours.

Draw a tape diagram to represent the rate.

....	
....	

a) Find the rate of speed at which Amr drives.

b) How many kilometers do Amr cover when he drive for 7 hours?

....

Unit 10 Unit Rate and Percent



Concept 10.2 Convert Measurements with Ratios

Lessons 4 - 6 The Conversion Factor

Learning Objectives:

By the end of these lessons, the student will be able to:

- Explore the conversion factor as a numerical ratio between equivalent values in different units of measurement.
- Use conversion factors to convert between different units of measurement within the same measurement system.
- Apply multiple conversion factors to compare speeds specified in different units of measurement.







Lessons 4-6 The Conversion Factor

Explore the Conversion Factor

Conversion Factor

It is a numerical ratio between two equal quantities expressed in different units within the same measurement system.

Ex. of conversion factor:

- One day: 24 hours
- 1 meter: 100 cm
- 60 minutes: 1 hour
- $\frac{1 \text{ kg}}{1,000 \text{ g}}$
- $\frac{1,000 \text{ m}}{1 \text{ km}}$
- $\frac{1 \text{ pound}}{100 \text{ piasters}}$

Comparison between unit rate and conversion factor

	Similarities Both Terms Describe Ratios Using 1	Differences
Unit Rate	1 must be the value of the second quantity.	Comparing two different quantities
Conversion Factor	1 can refer to a measure of the value of either quantity.	Comparing different units of measurement for the same quantity

1 Put (✓) in front of the ratio that represents the conversion factors in each of the following:

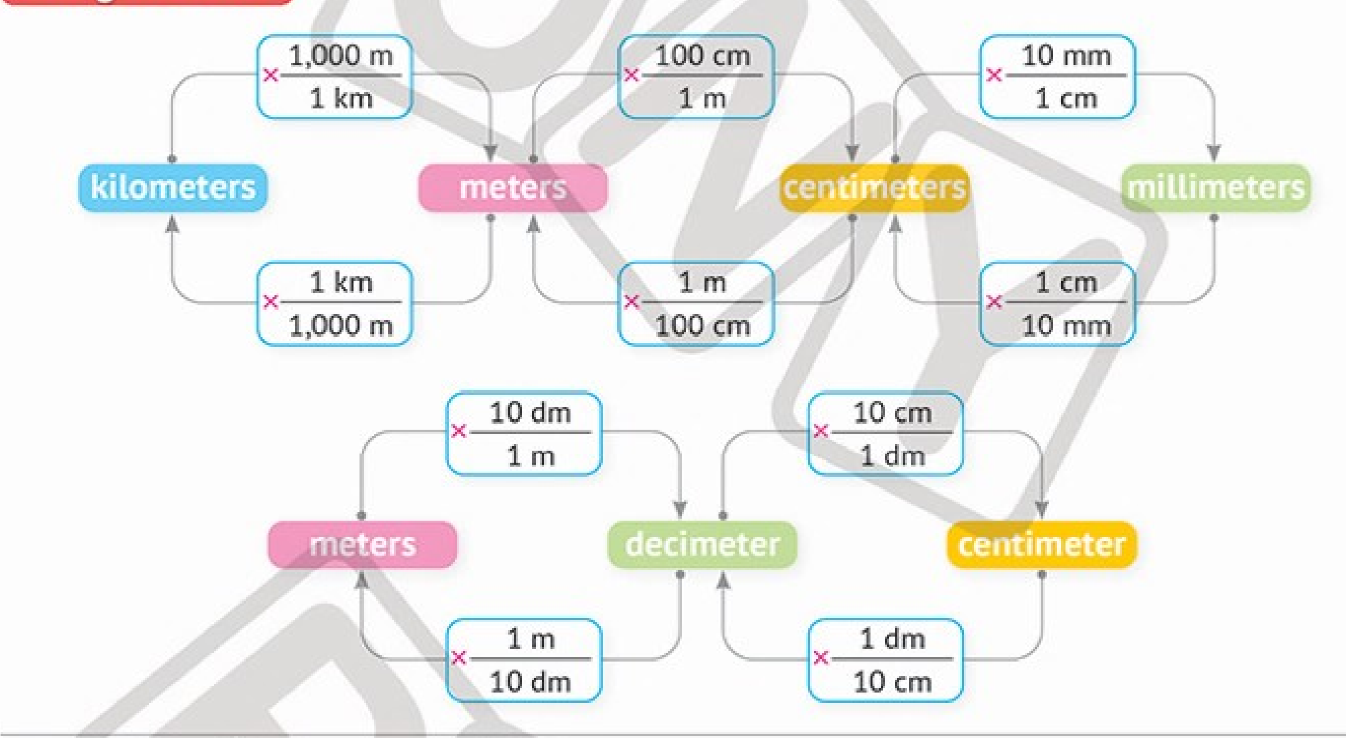
a) 1 day: 12 hours ( )	b) 7 days: 1 week ( )	c) 100 cm: 10mm ( )
d) $\frac{100 \text{ cm}}{1 \text{ m}}$ ( )	e) $\frac{3 \text{ km}}{200 \text{ m}}$ ( )	f) $\frac{5 \text{ kg}}{5 \text{ g}}$ ( )
g) $\frac{1 \text{ km}}{1,000 \text{ m}}$ ( )	h) $\frac{10 \text{ mm}}{1 \text{ cm}}$ ( )	i) $\frac{1 \text{ pound}}{100 \text{ piasters}}$ ( )

Using the Conversion Factor

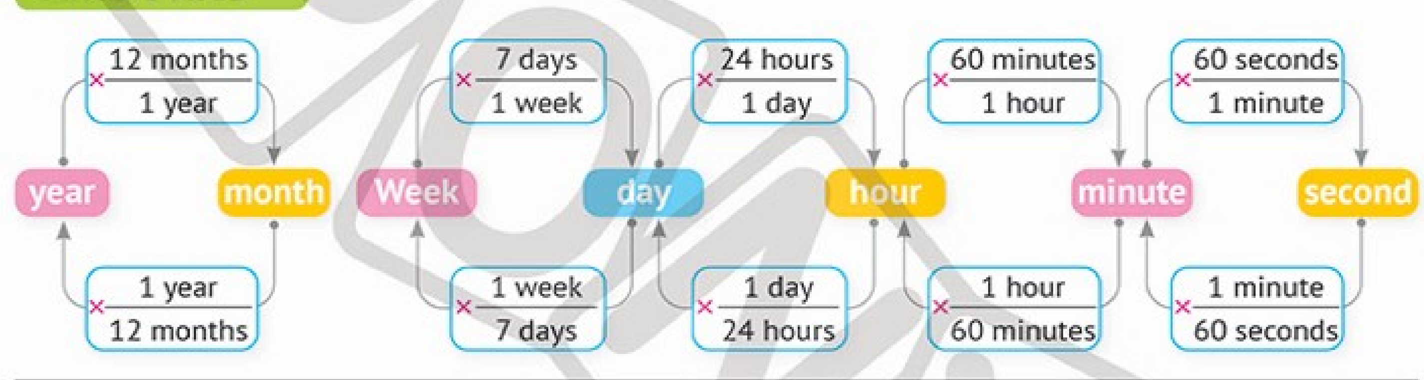
1 Use the conversion factor to convert between different units of measurement within the same measurement system

By multiplying by the conversion factor as follows.

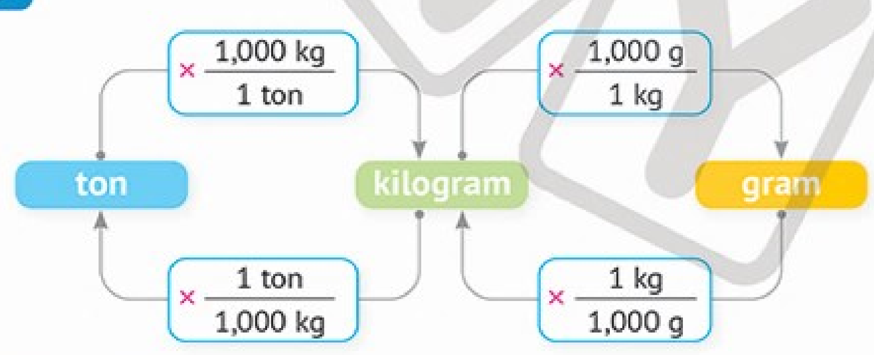
Length Units:



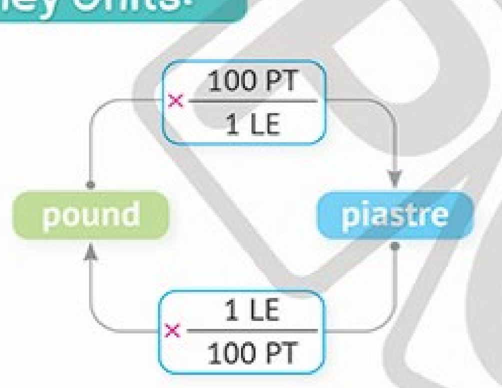
Time Units:



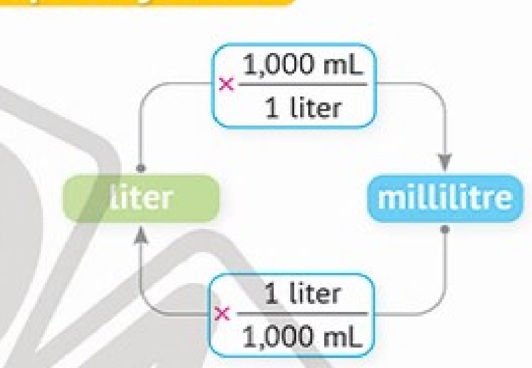
Money units:



Money Units:



Capacity Units:



Ex.

a) $14{,}600 \text{ cm} = \overset{146}{\cancel{14{,}600}}\ \cancel{\text{cm}} \times \dfrac{1 \text{ m}}{\cancel{100}\ \cancel{\text{cm}}} = 146 \text{ m}.$

b) $22 \text{ m} = 22\ \cancel{\text{m}} \times \dfrac{100 \text{ cm}}{1\ \cancel{\text{m}}} = 2{,}200 \text{ cm}.$

c) $120 \text{ minutes} = \overset{2}{\cancel{120}}\ \cancel{\text{minutes}} \times \dfrac{1 \text{ hour}}{\cancel{60}\ \cancel{\text{minutes}}} = 2 \text{ hours}.$

d) $200 \text{ g} = \overset{2}{\cancel{200}}\ \cancel{\text{g}} \times \dfrac{1 \text{ kg}}{\underset{10}{\cancel{1{,}000}}\ \cancel{\text{g}}} = 0.2 \text{ kg}.$

e) $2 \text{ hours} = 2\ \cancel{\text{hours}} \times \dfrac{60 \text{ minutes}}{1\ \cancel{\text{hour}}} = 120\ \cancel{\text{minutes}} \times \dfrac{60 \text{ sec}}{1\ \cancel{\text{min}}} = 7{,}200 \text{ sec}.$

Or $2 \text{ hours} = 2\ \cancel{\text{hours}} \times \dfrac{3{,}600 \text{ sec}}{1\ \cancel{\text{hour}}} = 7{,}200 \text{ sec}.$

f) $60{,}000 \text{ cm} = \overset{600}{\cancel{60{,}000}}\ \cancel{\text{cm}} \times \dfrac{1 \text{ m}}{\cancel{100}\ \cancel{\text{cm}}} = \overset{6}{\cancel{600}}\ \cancel{\text{m}} \times \dfrac{1 \text{ km}}{\underset{10}{\cancel{1{,}000}}\ \cancel{\text{m}}} = 0.6 \text{ km}.$

Or $60{,}000 \text{ cm} = \overset{6}{\cancel{60{,}000}}\ \cancel{\text{cm}} \times \dfrac{1 \text{ km}}{\underset{10}{\cancel{100{,}000}}\ \cancel{\text{cm}}} = 0.6 \text{ km}.$

2 Complete the following:

a) 5 km = ... × $\frac{..................}{..................}$ = ... m

b) 2,000 cm = ... × $\frac{..................}{..................}$ = ... m

c) 20 Kg = ... × $\frac{..................}{..................}$ = ... gm

d) 6 years = ... × $\frac{..................}{..................}$ = ... months

e) 180 minutes = ... × $\frac{..................}{..................}$ = ... hours

f) 450 piasters = ... × $\frac{..................}{..................}$ = ... pound

g) 6.5 tons = ... × $\frac{..................}{..................}$ = ... gm

h) 120 mm = ... × $\frac{..................}{..................}$ = ... m

2 Use the conversion factor to convert between unit rates (speed):

Ex. Using the appropriate conversion factor to convert the following unit rates:

a) 12 km per hour to:

1. Meters per hour 2. Kilometers per minute 3. Meters per minute

Answer

1. $12 \text{ km/hr} = \frac{12 \text{ km}}{1 \text{ hour}} \times \frac{1{,}000 \text{ m}}{1 \text{ km}} = \frac{12{,}000 \text{ m}}{1 \text{ hour}} = 12{,}000 \text{ m/hr}$

2. $12 \text{ km/hr} = \frac{12 \text{ km}}{1 \text{ hour}} \times \frac{1 \text{ hour}}{60 \text{ mins}} = \frac{12 \text{ km}}{60 \text{ mins}} = 0.2 \text{ km/min}$

3. $12 \text{ km/hr} = \frac{12 \text{ km}}{1 \text{ hour}} \times \frac{1{,}000 \text{ m}}{1 \text{ km}} \times \frac{1 \text{ hour}}{60 \text{ mins}} = \frac{12{,}000 \text{ m}}{60 \text{ mins}} = 200 \text{ m/min.}$

b 240 cm per second to:

1 Meters per second

2 Centimeters per minute

3 Meters per minute

Answer

1 $240 \text{ cm/second} = \frac{240 \text{ cm}}{1 \text{ sec}} \times \frac{1 \text{ m}}{100 \text{ cm}} = \frac{240 \text{ m}}{100 \text{ sec}}$

$= 2.4$ meter per second.

2 $240 \text{ cm/second} = \frac{240 \text{ cm}}{1 \text{ sec}} \times \frac{60 \text{ sec}}{1 \text{ min}} = \frac{14{,}400 \text{ cm}}{1 \text{ min}}$

$= 14{,}400$ cm per minute

3 $240 \text{ cm/second} = \frac{240 \text{ cm}}{1 \text{ sec}} \times \frac{1 \text{ m}}{100 \text{ cm}} \times \frac{60 \text{ sec}}{1 \text{ min}} = \frac{144 \text{ m}}{1 \text{ min}}$

$= 144$ meter per minute.

3 Using the appropriate conversion factor, convert the following unit rates (speed) to meters per minute:

a 4.2 km per hour

b 3 cm per second

a 4.2 Kilometers per hour = ...

= .... meters/minute.

b 3 cm per second = ...

= .... meters/minute.

4 **The following table shows the speed number of a group of animals.**

Convert the speed of each of them to kilometers per hour.

Then arrange them from slowest to fastest

Animal	Speed
Black Mamba	5.6 meters per second
Coyote	69 kilometers per hour
Roadrunner	889 centimeters per second
Great White Shark	0.93 of a kilometer per minute

Answer

Black Mamba

5.6 meters per second = ... = ... km/hour.

Coyote

69 kilometers per hour = ... = ... km/hour

Roadrunner

889 centimeters per second = ... = ... km/hour

Great White Shark

0.93 of a kilometer per minute = ... = ... km/hour

The order

Slowest			Fastest



/ 10

1 Complete:

a 20 kg = ... gram.

b 4.2 km/h = ... m/min.

c 3 cm/sec = ... m/min.

d 6.5 ton = ... gram.

2 Choose the correct answer:

a 1 day: 24 hours is considered a/an ....

(unit ratio or equivalent ratio or conversion factor or otherwise)

b 280 cm / sec = ... m/min (140 or 168 or 280 or 28)

c 450 PT = ... LE (4500 or 450 or 45 or 4.5)

d 180 minutes = ... hours (2 or 3 or 4 or 5)

3 Yasmin drove her car at a speed of 96 km/hr. Calculate her speed in m/min.

....

....

Unit 10

Unit Rate and Percent



Lesson 7 Exploring Percent

Learning Objectives:

By the end of this lesson, the student will be able to:

- Explore the meaning of percentage.
- Relate percentages to fractions and decimals.

Lessons 8 - 10 Using Models to Find the Part, the Whole, and the Percentage

Learning Objectives:

By the end of these lessons, the student will be able to:

- Determine the part, the whole, and the percentage in a problem and determine the unknown value.
- Use models to find a part of a whole in a percentage problem.
- Use a variety of methods to solve problems that involve finding the whole.
- Develop an algorithm to find the whole.
- Use a model to calculate the percentage when knowing the part and the whole.

Lesson 11 Applications on Percentage

Learning Objective:

By the end of this lesson, the student will be able to:

- Use mental calculation to determine the percentage values of items offered for sale at a reduced price.





Lesson 7 Exploring Percent

Unit 10

The Percentage

It is a relative value that determines the equivalent number of hundredths of any quantity (or it is a ratio whose second term is 100).

- The symbol (%) is used to express a percentage and is read as "percent."

Ex.
- The ratio 20:100 is equivalent to the percentage 20% and is read as "20 percent."



- The ratio $\frac{3}{5}$ is equivalent to the percentage of 60% and is read as "60 percent." $\left(\frac{3}{5} = \frac{60}{100}\right)$

Percentage in Daily Life

1 Percentage 100%:

Means the whole quantity or each element in the group.

$$\left(100\% = \frac{100}{100} = 1\right)$$

Ex. **The student answered 100% of the questions correctly → all the student's answers are correct.**

2 Percentage 50%:

Means exactly half the quantity or half the number of the group.

$$\left(50\% = \frac{50}{100} = \frac{1}{2}\right)$$

Ex. **There are 10 boys on the field and 50% of them are wearing blue shirts**

→ Half of the boys (5 boys) are wearing blue shirts.

> If the percentage is greater than 50%,
> it means that the quantity or number is greater than half of the whole quantity or total number, and vice versa.

1 Choose the percentage that best suits each of the following situations:

(50% or 35% or 100% or 80%)

a) All the students in the mathematics class were present today. (..................)

b) Most of the students in the mathematics class were present today. (..................)

c) Less than half of the students in mathematics class were present today. (..................)

d) If the total number of students in the mathematics class is 20, this means that exactly 10 of them were present today. (..................)

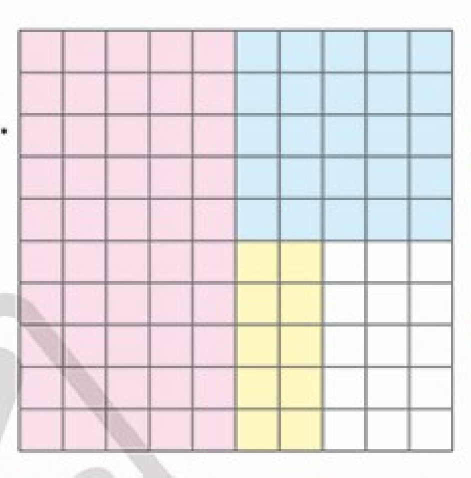
2 Complete using (greater than, less than, or exactly):

a) If the cup is 50% full, this means that (..................) half of the cup is full.

b) If the cup is 65% full, this means that (..................) half of the cup is full.

c) If the cup is 20% full, this means that (..................) half of the cup is full.


The opposite figure represents one integer divided into 100 parts (squares).



50 parts are colored red

25 parts are colored blue

10 parts are colored yellow

15 parts are uncolored

• These parts can be expressed in several ways, as in the following table:

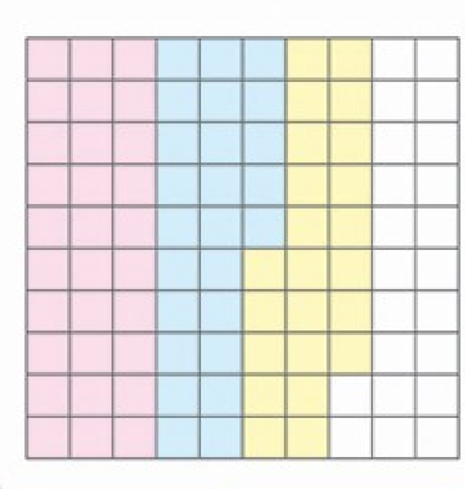
Color	Number of Parts	Fraction	Decimal	Ratio of the Colored Part to all Parts
Red	50	$\frac{50}{100} = \frac{1}{2}$	0.50	50 : 100 = 50 %
Blue	25	$\frac{25}{100} = \frac{1}{4}$	0.25	25 : 100 = 25 %
Yellow	10	$\frac{10}{100} = \frac{1}{10}$	0.10	10 : 100 = 10 %
Uncolored	15	$\frac{15}{100} = \frac{3}{20}$	0.15	15 : 100 = 15 %
Total	100	$\frac{100}{100} = 1$	1	100 : 100 = 100 %



- $\frac{1}{2} = 50\%$
- $\frac{1}{4} = 25\%$
- $\frac{3}{4} = 75\%$
- $\frac{1}{5} = 20\%$
- $\frac{2}{5} = 40\%$
- $\frac{3}{5} = 60\%$
- $\frac{4}{5} = 80\%$
- $\frac{1}{8} = 12.5\%$
- $\frac{3}{8} = 37.5\%$
- $\frac{5}{8} = 62.5\%$
- $\frac{7}{8} = 87.5\%$

3 Notice the grid 10 × 10

Then complete the following table:



Color	Number of Parts	Fraction	Decimal	Ratio of the Colored Part to all Parts	Percentage
Red	....	....	....	.... :	= ....
Blue	....	....	....	.... :	= ....
Yellow	....	....	....	.... :	= ....
Uncolored	....	....	....	.... :	= ....
Total	....	....	....	.... :	= ....

Converting Fractions to Percentages

- To convert a fraction to a percentage, we must set the denominator = 100

Ex. Convert the following fractions to a percentage:

a $\frac{4}{5}$ b $\frac{13}{25}$ c $\frac{5}{8}$ d $1\frac{1}{2}$

1 Method (1) Convert the denominator directly to 100:

a $\frac{4}{5} = \frac{4 \times 20}{5 \times 20} = \frac{80}{100} = 80\,\%$

b $\frac{13}{25} = \frac{13 \times 4}{25 \times 4} = \frac{52}{100} = 52\,\%$

c $\frac{5}{8} = \frac{5 \times 12.5}{8 \times 12.5} = \frac{62.5}{100} = 62.5\,\%$

d $1\frac{1}{2} = \frac{3 \times 50}{2 \times 50} = \frac{150}{100} = 150\,\%$

2 Method (2) Multiplying the common fraction by 100% or 100/100 (not abbreviated):

a $\frac{4}{5} = \frac{4}{\cancel{5}_1} \times \cancel{100}^{20}\,\% = 80\ \%$

b $\frac{13}{25} = \frac{13}{\cancel{25}_1} \times \cancel{100}^{4}\,\% = 52\ \%$

c $\frac{5}{8} = \frac{5}{\cancel{8}_2} \times \cancel{100}^{25}\,\% = 62.5\,\%$

d $1\frac{1}{2} = \frac{3}{\cancel{2}_1} \times \cancel{100}^{50}\,\% = 150\,\%$

3 Method (3): Converting fractions to decimals and then writing them as a percentage by multiplying it by 100 %:

a $\frac{4}{5} = 0.8 \times 100\,\% = 80\ \%$

b $\frac{13}{25} = 0.52 \times 100\,\% = 52\ \%$

c $\frac{5}{8} = 0.625 \times 100\,\% = 62.5\,\%$

d $1\frac{1}{2} = 1.5 \times 100\,\% = 150\,\%$

4 Complete the following table:

	Fraction	Equivalent Fraction with a Denominator of 100	Decimal	Percentage
a	$\frac{1}{4}$			
b	$\frac{1}{2}$			
c	$\frac{7}{10}$			
d	$2\frac{2}{5}$			
e	$\frac{3}{20}$			

Theme 3

5 **Write each of the following as a percentage:**

ⓐ $\frac{3}{4}$ ⓑ 0.07 ⓒ 1 : 5

ⓐ ....

ⓑ ....

ⓒ ....

Ex. **Write the percentage 32% in the form of**
(a fraction in its simplest form 'a decimal - a ratio'):

$32\% = \frac{32}{100}$

- (fraction) → $= \frac{8}{25}$
- (decimal) → = 0.32
- (ratio) → = 8 : 25

6 **Complete the following table:**

	Percentage	Equivalent Fraction with a Denominator of 100	Fraction	Decimal	Ratio
ⓐ	25 %				
ⓑ	80 %				
ⓒ	36 %				



$\frac{\quad}{10}$

1 Match:

a $\frac{3}{4}$ b $\frac{2}{5}$ c $2\frac{3}{8}$ d 0.22 e 1

1 40 % 2 100 % 3 237.5 % 4 75 % 5 22 %

2 Complete:

a $\frac{1}{8}$ = ... % b $\frac{3}{20}$ = ... %

c 1.36 = $\frac{\dots\dots}{\dots\dots}$ (in the simplest form)

3

Galal eats $\frac{7}{20}$ of pizza, represent the fraction of what Galal eats into percent?

....

4

Ahmed has covered 65% of his way home, convert the present into fraction.

....

....



Using Models to Find the Part, the Whole, and the Percentage



(I)Classification of Percentage Problems

- A percentage usually indicates a comparison between a part and a whole.
- Percentage problems are classified according to the unknown value to be found (whole, part, or percentage).

Ex. **If the number of students in the class is 40 students,**

16 of them are boys. Then the percentage of boys is ....

Whole	Part	Percent
40	16	Unknown

A travel agency booked 1,500 tourist trips to visit Egypt. 60% of them were to visit the Pyramids of Giza.

How many tourist trips has the agency booked to visit the Pyramids of Giza?

Whole	Part	Percent
1,500	Unknown	60 %

Some analysts estimate that 75% of students wear glasses.

If there are 50 students who wear glasses, approximately how many students are there in the lecture hall?

Whole	Part	Percent
Unknown	50	75 %

1 **Write a description of the following options representing a percentage of the following.**

(Find the percentage, find the part, or find the whole)

ⓐ 10% of the students in the class wear red clothes. There are 30 students in the class.

How many students wear red clothes? (..)

ⓑ We ate five out of 10 bananas. What percentage of the bananas did we eat? (..............................)

ⓒ 300 students out of the total number of students in the school have pets. If 30% of all students have pets, how many students are in the school? (..............................)

ⓓ If approximately 37% of Egypt's population is under 18 years old. Suppose that 700 people live in a residential area in Egypt. How many people are under the age of 18 in this region? (..............................)

ⓔ If the percentage of people who prefer wrestling according to the survey they participated in is 49% and there are 77 surveys about people who prefer wrestling, how many people participated in the surveys?

(..............................)

(2) Using Models to Solve Percentage Problems

First: The tape diagram

Solution steps

1) Draw a tape diagram divided into 10 equal units, each unit representing 10% of the whole.
2) Find the value of each unit of the tape.
3) Find the unknown.

1 Finding the Percentage:

Ex. **What is the percentage of 63 out of go.**

unit value
90 ÷ 10 = 9

Whole
90

9	9	9	9	9	9	9	9	9	9

63
Part

Whole	Part	Percent
90	63	Unknown

Answer: The unit value: 90 ÷ 10 = 9

63 represents 7 parts.

Therefore: Percentage: 70%

2 Find a Part of the Whole:

Ex. What is the value of 40% out of 85.

Whole	Part	Percent
85	Unknown	40 %

unit value
85 ÷ 10 = 8.5

Whole
85

8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5

8.5 × 4 = 34
Part

Answer: Unit value: 85 ÷ 10 = 8.5

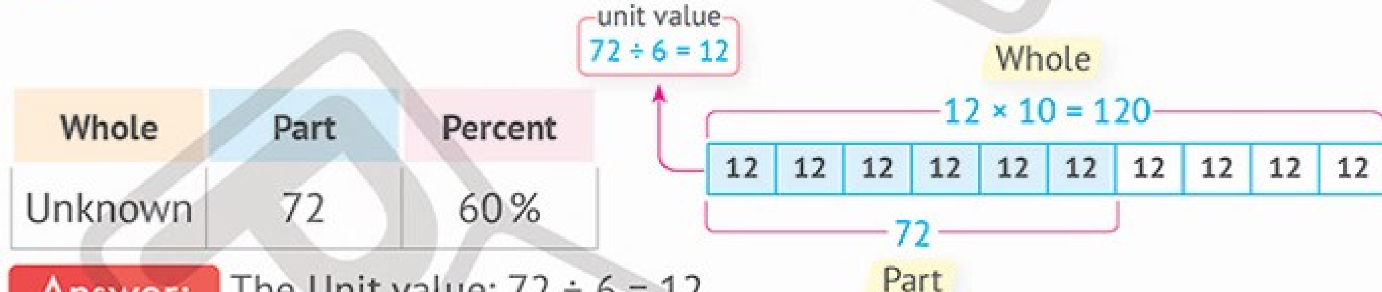
40% represents 4 parts.

Therefore: the value of the part: 8.5 × 4 = 34

3 Find All:

Ex. 60% of what equal 72.

Whole	Part	Percent
Unknown	72	60 %



Answer: The Unit value: 72 ÷ 6 = 12

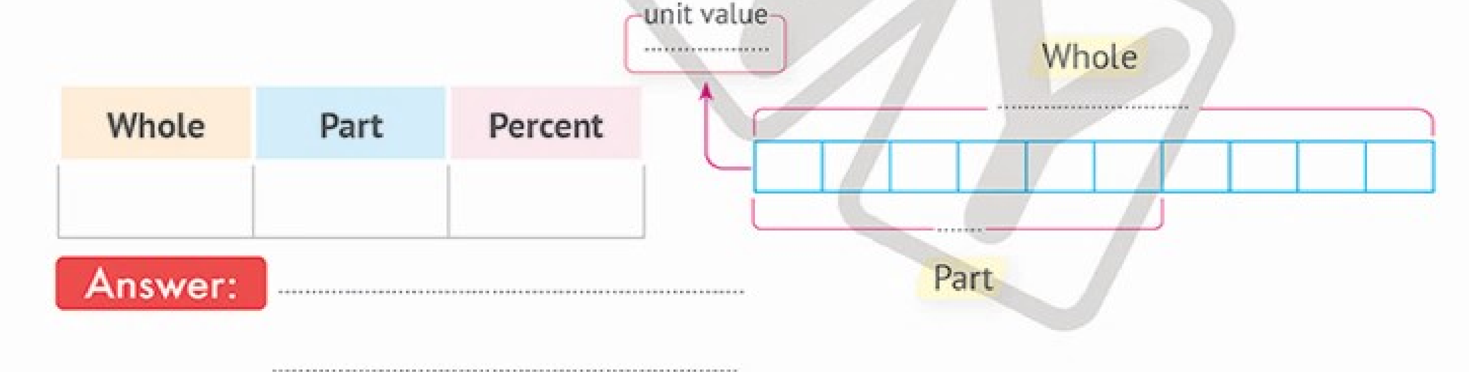
100% (the whole) represents 10 parts.

Therefore: the value of the whole: 12 × 10 = 120

2 Using a tape diagram, answer the following questions:

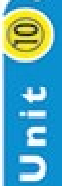
ⓐ A primary school with 720 students. If the number of boys in this school is 432, find the percentage of the number of boys.

Whole	Part	Percent

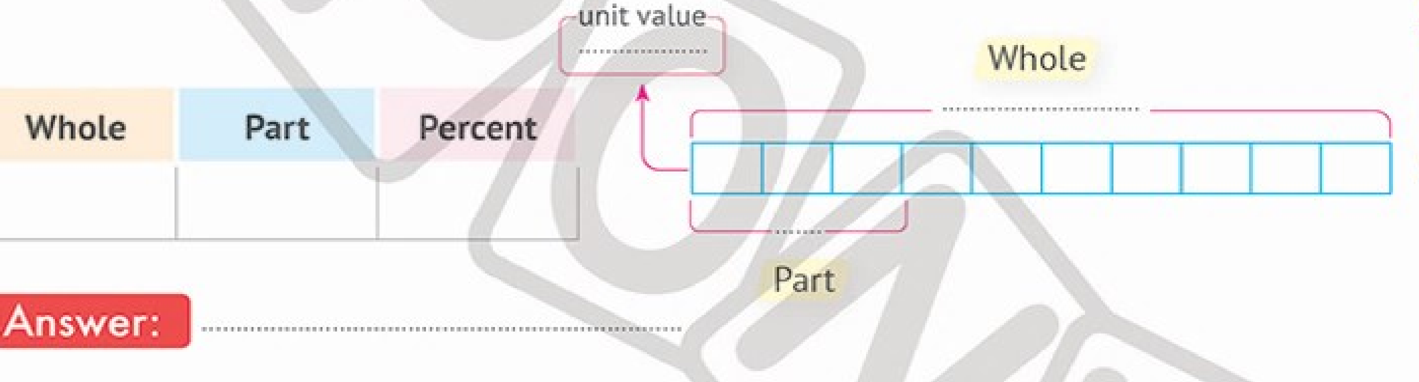


Answer: ....

....



ⓑ Maryam bought a dress that cost 300 pounds. If she had a 30% discount, how much would she pay for this dress?

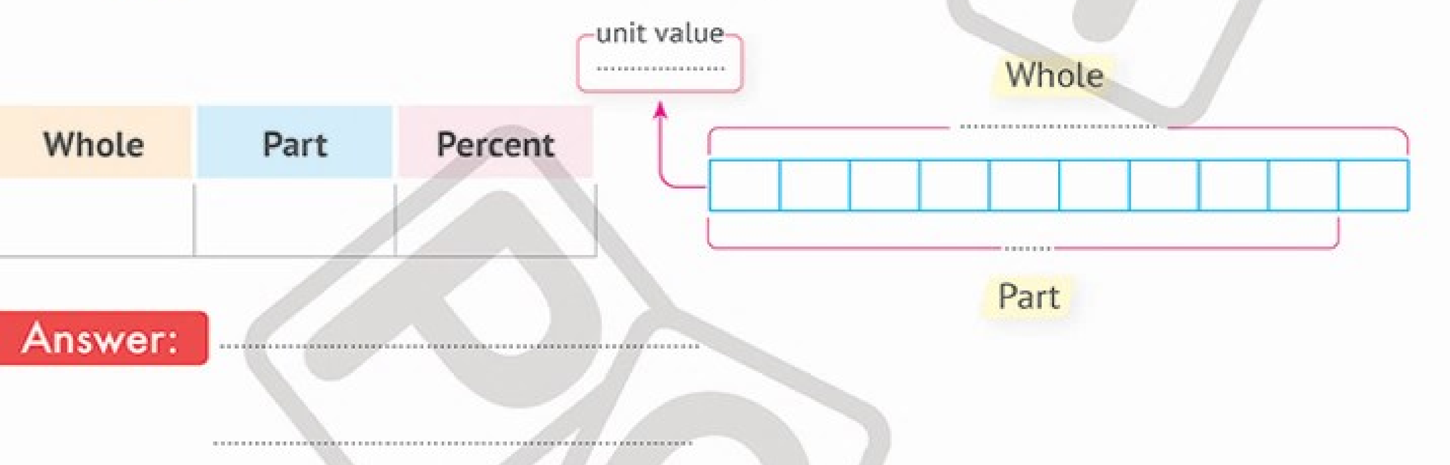


Whole	Part	Percent

Answer: ....

....

ⓒ In the mathematics exam, Nouran got 45 marks. If this score represents 90% of the total score for the exam, find the total score for this exam.



Whole	Part	Percent

Answer: ....

....

Second: The double number line

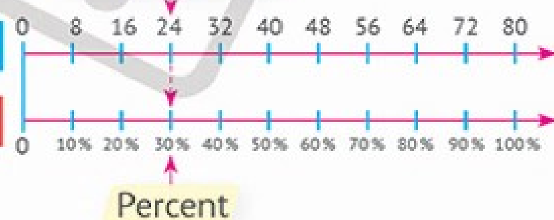
Solution steps

1) Draw a double number line, dividing each number into 10 parts.
2) The upper number line represents the whole, and the pattern is determined by dividing the whole by 10
3) The bottom number line represents the percentage in a pattern that increases by 10%.
4) Find the unknown.

1 Finding the Percentage:

Ex. **Find the percentage of 24 out of 80.**

Whole	Part	Percent
80	24	unknown



Answer: 80 ÷ 10 = 8, the top number line pattern increases by 8.

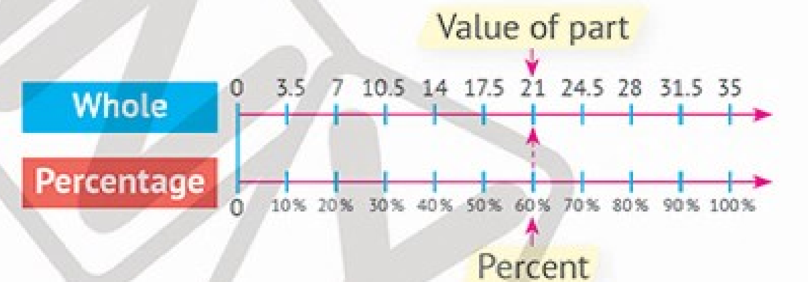
24 on the top number line corresponds to the percentage: 30%.

Therefore: Percentage: 30%

2 Find a Part of the Whole:

Ex. **Calculate 60 % of 35.**

Whole	Part	Percent
35	unknown	60 %



Answer: 35 ÷ 10 = 3.5, The top number line pattern increases by 3.5

60% on the lower number line corresponds to 21 on the upper number line.

Therefore: The value of the part: 21

3 Find the Whole :

Ex. 25% of what gets 12.5.

Whole	Part	Percent
Unknown	12.5	25 %

Value of part: 12.5

Whole: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50

Percent: 0, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%

Percent: 25 %

Answer: the number of parts on the bottom number line

$12.5 \div 2.5 = 5$, the top number line pattern increases by 5.

100% (all) on the lower number line corresponds to 50 on the upper number line.

Therefore: The value of all: 50

3 Using a double number line, answer the following questions:

ⓐ In the mathematics exam, Hossam got 16 out of 20 marks.

Find the percentage of the grade that Hossam obtained.

Whole	Part	Percent

Whole: 0

Percent: 0, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%

....

....

ⓑ If the zoo gets 800 kilograms of feed daily, if the gorillas eat 25% of the amount of feed that the zoo gets daily, how many kilograms of feed do the gorillas eat daily in the zoo?

Whole	Part	Percent

Whole: 0

Percent: 0, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%

....

....

C) Ahmed participated in 6 races, which is equivalent to 30% of the activities of a sports festival. How many races does this festival have?

Whole	Part	Percent

Whole: 0 ...
Percent: 0, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%

....

....

Third: Using 10 × 10

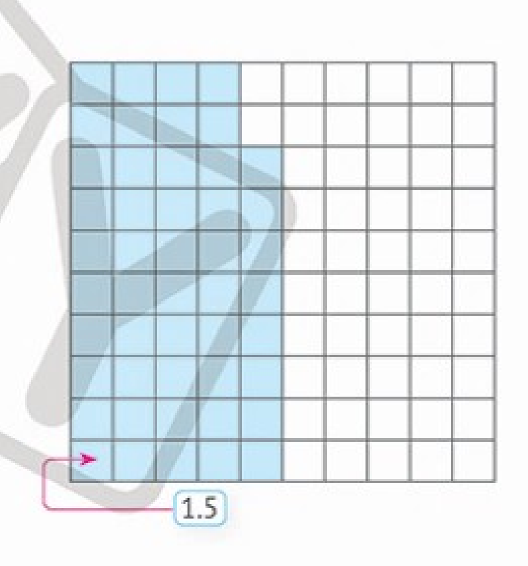
Solution steps

1. The grid consists of 100 squares, each square accounting for 1%.
2. Find the value of each square by dividing the whole by 100.
3. Find the unknown.

1 Finding the Percentage:

Ex. **What is the Percentage of 72 out of 150.**

Whole	Part	Percent
150	72	Unknown



Answer: 150 ÷ 100 = 1.5

(The value of each square is 1.5).

72 ÷ 1.5 = 48 (Number of squares representing the part = 48 squares)

Therefore: Percentage: 48 %

2 Find a Part of the Whole:

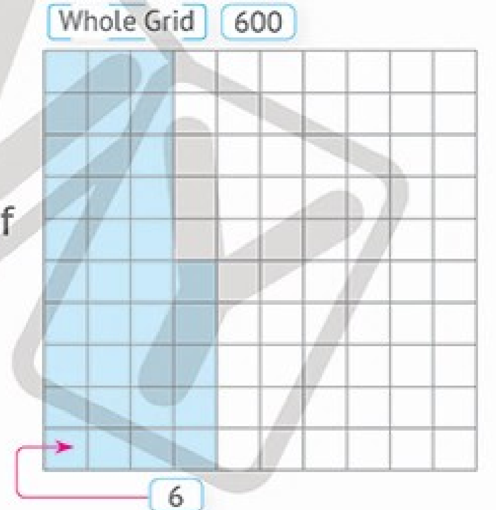
Ex. **What is the value of 35% of 600.**

Whole	Part	Percent
600	Unknown	35 %

Answer: 600 ÷ 100 = 6

(The value of each square is 6)

35% represents the part. The number of squares representing the part = 35 squares.





Therefore: The value of the part: 35 × 6 = 210

3 Find the Whole:

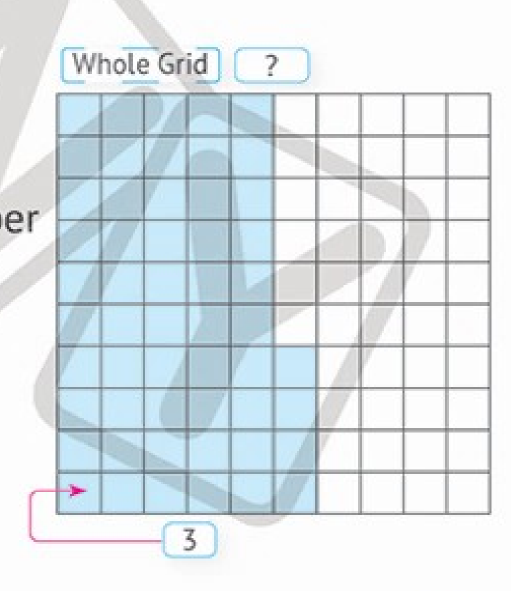
Ex. **54% of what gets 162.**

Whole	Part	Percent
Unknown	162	54 %

Answer: 162 ÷ 54 = 3

(The value of each square is 3)

100% represents the whole. The number of squares representing the whole = 100 squares.



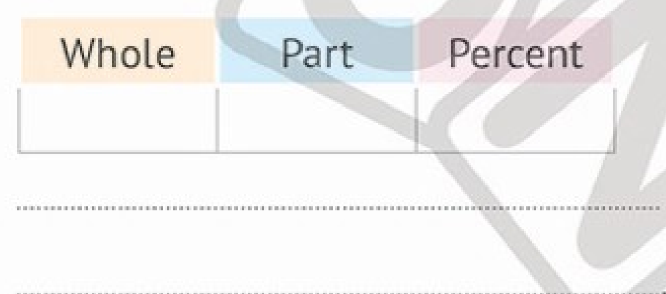


Therefore: The value of whole: 3 × 100 = 300

4 Using a grid of 10 × 10 answer the following:

a. Farouk practices karate for 160 minutes a week.

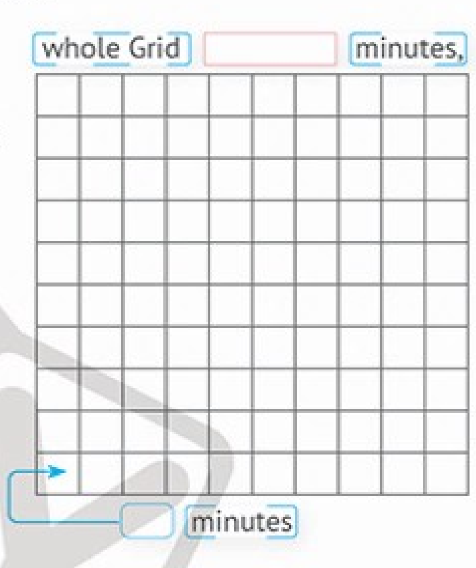
If he practices on Monday for 32 minutes, calculate the percentage of time that Farouk spent practicing karate on Monday.



Whole	Part	Percent

....

....



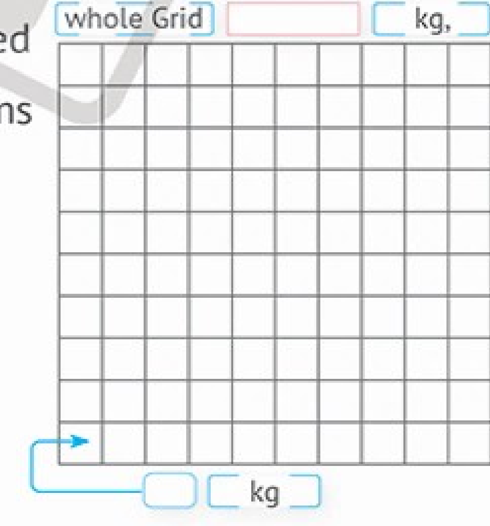
b. If the zoo receives 800 kilograms of feed daily, assuming that the zebras eat 60% of the feed that the zoo receives daily, how many kilograms of feed do the zebras eat daily at the zoo?



Whole	Part	Percent

....

....

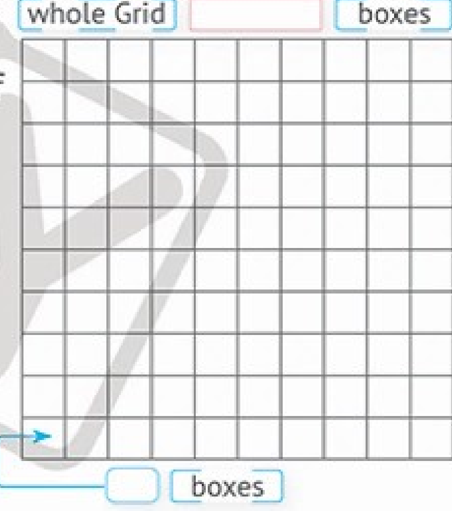


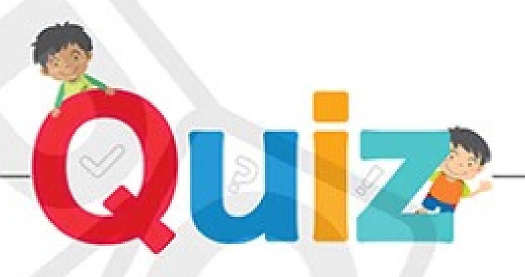
c. A merchant bought a number of boxes of goods. He stored 40 boxes of goods, which represents 80% of the boxes. What is the total number of boxes?

Whole	Part	Percent

....

....





/ 10

1 Complete:

a) 30% of 80 = ...

b) 15% of .... = 75

c) 65% of 900 = ...

d) .... % of 600 = 120

e) A number which 80% of it equals to 480 is ....

2 There are 60 pupils in a calass; 6 of them were absent one day. Find the percentage of the absentees on that day by using the opposite tape diagram:

Whole	Part	Percent
60	6	Unknown

unit value ....

Whole ....

Part ......

Answer: ....

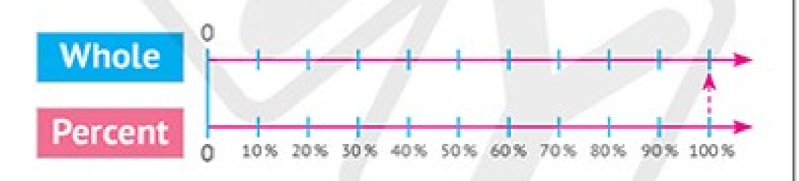
....

3 In mathematics exam, Omar got 18 out of 20.

Find the percentage of the marks he got.



Whole	Part	Percent



....

....

Fourth: Using an algorithm to solve percentage problems

Part 2

$$\text{Percent} = \frac{\text{Part}}{\text{whole}} \times 100\%$$

Whole = Part ÷ Percent

Part = Percent × Whole

1 Finding the Percentage:

Ex. What is the Percentage of 90 out of 360.

Whole	Part	Percent
360	90	Unknown

Answer:

Percent: $= \frac{90}{360} \times 100\% = 25\%$

2 Find a Part of the Whole:

Ex. What is the value of 15% of 400.

Whole	Part	Percent
400	Unknown	15 %

Answer:

Percent: $= \frac{15}{100} \times 400 = 60$

3 Find the Whole:

Ex. If 20% of anumber is 16 what is the number.

Whole	Part	Percent
Unknown	16	20 %

Answer:

Percent: $= 16 \div \frac{20}{100}$

$= 16 \times \frac{100}{20} = 80$

1 Using an appropriate algorithm, answer the following:

a One of the school trips, 14 out of 35 students participated in one of the school classrooms. Find the percentage of students participating in the trip in this class.

....

....

Whole	Part	Percent

b A tour bus has 50 seats, with school trip students sitting on 64% of the seats. How many students participated in the trip?

....

....

Whole	Part	Percent

c If the percentage of absentees on one day is 5% of the class's students and the number of absentees is 4 students, how many students are in this class?

....

....

Whole	Part	Percent

d An employee's monthly salary is 8,400 pounds, of which he spends 70% and saves the rest. How much does the employee save?

....

....

Whole	Part	Percent

e Roads linking two cities are paved in 3 stages. 40% of the roads were paved in the first stage, 35% were paved in the second stage, and the rest were paved in the third stage.

If the length of the section that was paved in the first stage is 16 kilometers.

Find: 1 the length of the road.

2 the length of the section that was paved in both the second and third stages.

....

....

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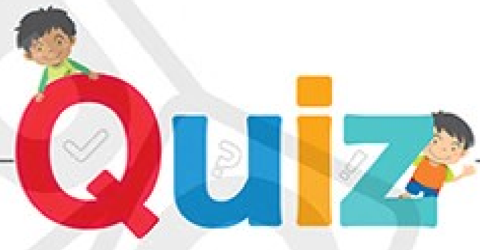
f A school of 900 students 5% of them were absent, find the number of students who were attended.

....

....

....

....



10

1 Choose the correct answer:

a The percentage of 5 squares of 500 squares is .... %.

(5 or 1 or 0.01 or 0.1)

b 25% of 1,000 = 50 % of .... (2,000 or 1,500 or 1,250 or 500)

c 36% of .... = 144 (400 or 360 or 480 or 560)

2 Complete:

a A school has 600 students. If the number of girls is 240, then the percentage of the girls is ....

b 60% of 540 equals ....

c 27% of .... = 54

3 Murad bought a new computer, he paid 20% of it. If he paid 600 LE, find the price of that computer.

....

....



Applications on Percentage

Use mental math to find percentage values

1 Determine the Percentage 10%:

- To get 10% of any number, divide that number by 10. (we always get the same numbers, but with the decimal point moved one place to the left).

- **Note the following table:**

Number	50	45	215	3,450	6,000
10% of the Number	5	4.5	21.5	345	600

1 Calculate 10% of each of the following numbers:

Number	60	9	120	2,219	6,500
10% of the Number	....	....	....	....	....

2 Determine Other Percentages Using the 10%:

- We can calculate another percentages using the 10%

1) Divide by 2 to get the value of 5%.

2) Multiply by 2 to get the value of 20%.

3) Multiply by 3 to get the value of 30%, and so on.

- **Note the following table:**

(From 10%: ÷ 2 → 5%; × 2 → 20%; × 3 → 30%; × 4 → 40%; × 5 → 50%)

Number	5 %	10 %	20 %	30 %	40 %	50 %
20	1	2	4	6	8	10
84	4.2	8.4	16.8	25.2	33.6	42
760	38	76	152	228	304	380

2 **Complete the following table:**

Number	5 %	10 %	20 %	50%	70 %
16	....	....	....	....	....
40	....	....	....	....	....
125	....	....	....	....	....
260	....	....	....	....	....
1,300	....	....	....	....	....

Applications on using mental math to find percentage values

1 Discounts:

Ex. **Maryam bought a dress that costs 300 pounds , if it has a 20% discount.**

How much does she pay for this dress? (using mental math)

Answer: The value of 10% of the price of the dress = 30 LE

The value of the discount rate is 20 % = 60 LE

The price of the dress after the discount: 300 – 60 = 240 LE

3 **Below is a list of items offered at a discounted price, and the discount percentage is shown next to it. Complete the table:**

- Determine the value of 10%, then use mental math to calculate the saved amount related to with the discount percentage shown for every item.
- Calculate the price for every item after applying the discount.

Item	Price	10 %	discount	Saved Price	After Discount
Shoes	1,400 LE	....	20 %	....	....
Shirt	900 LE	....	30 %	....	....
Jeans Trousers	500 LE	....	40 %	....	....

4 **Using mental math, find:**

25% of 48 pounds. (Note that: 25% = 20% + 5%)

....

....

5 **A pair of jeans costs 500 pounds if there is another discount of 15 percent applied to the new selling price after the original discount of 40 percent. What is the price of the pants now after the two discounts?**

....

....

2 Taxes and Added Amounts:

Ex. **In a restaurant, 15% of the price of the meal is added for taxes and services.**

If the value of the meal bill in this restaurant is 1,200 pounds.

Calculate the total amount required to be paid.

Answer: The value of 10% of the price of meal = 120 pounds

The value of 5% of the price of meal = 60 pounds

The value of 15% of the price of meal = 180 pounds

The total amount required to be paid = 1,200 + 180 = 1,380 EGP

6 **The announced price of a television is 10,500 pounds, and upon payment, a 10% sales tax is added.**

Find the price of the television after adding the tax.

....

....

7 **In a tourist restaurant, 10% of the meal price is added for taxes and 15% is added for services. If the value of the food bill in this restaurant is 2,600 pounds.**

Calculate the total amount required to be paid.

....

....



/ 10

1 Complete:

a The value of 10% of 3200 is ....

b The value 20% of 5.6 is ....

c The price of TV is 4,800 L.E, there is an extra tax of 10%, then the price of TV with tax is ....

2 By using mental math find:

a 20% of 48

....

....

b 15% of 80

....

....

c 35% of 600

....

....

3 600 students were tested in an examination, and 85% of them succeeded. Find the number of students who failed.

....

....

Theme 4

Applications of Geometry and Measurement



Theme Units

Unit 11 Coordinate Plane

Concept 11.1 Understand the Coordinate Plane

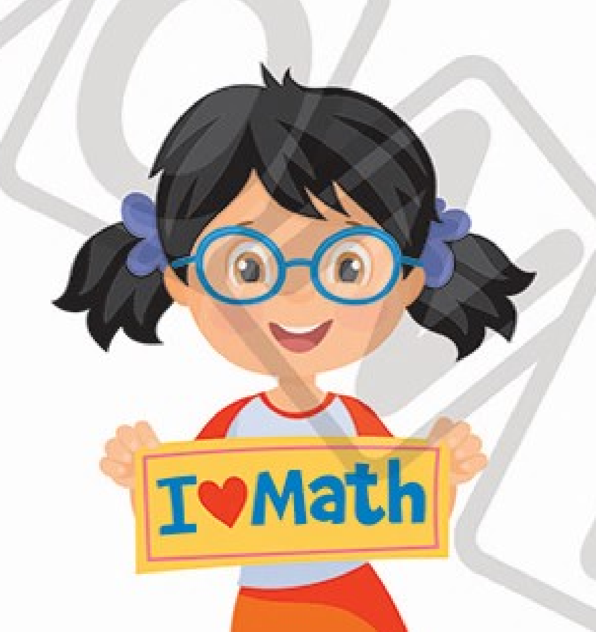
Lessons 1-3

Exploring the Coordinate Plane
Analyzing the Coordinate Plane
Analyzing Points on the Coordinate Plane

Learning Objectives:

By the end of these lessons, the student will be able to:

- Review locations of points in the first quadrant of the coordinate plane.
- Discover the need for other quadrants
- Discover how to plot points for each quadrant of the coordinate plane.
- Discover how to plot point by reflection in x-axis or y-axis..
- Expand understanding of ordered pairs and the four quadrants on the coordinate plane.
- Describe the location of points that do not lie at the intersection points of the lines of the coordinate plane.





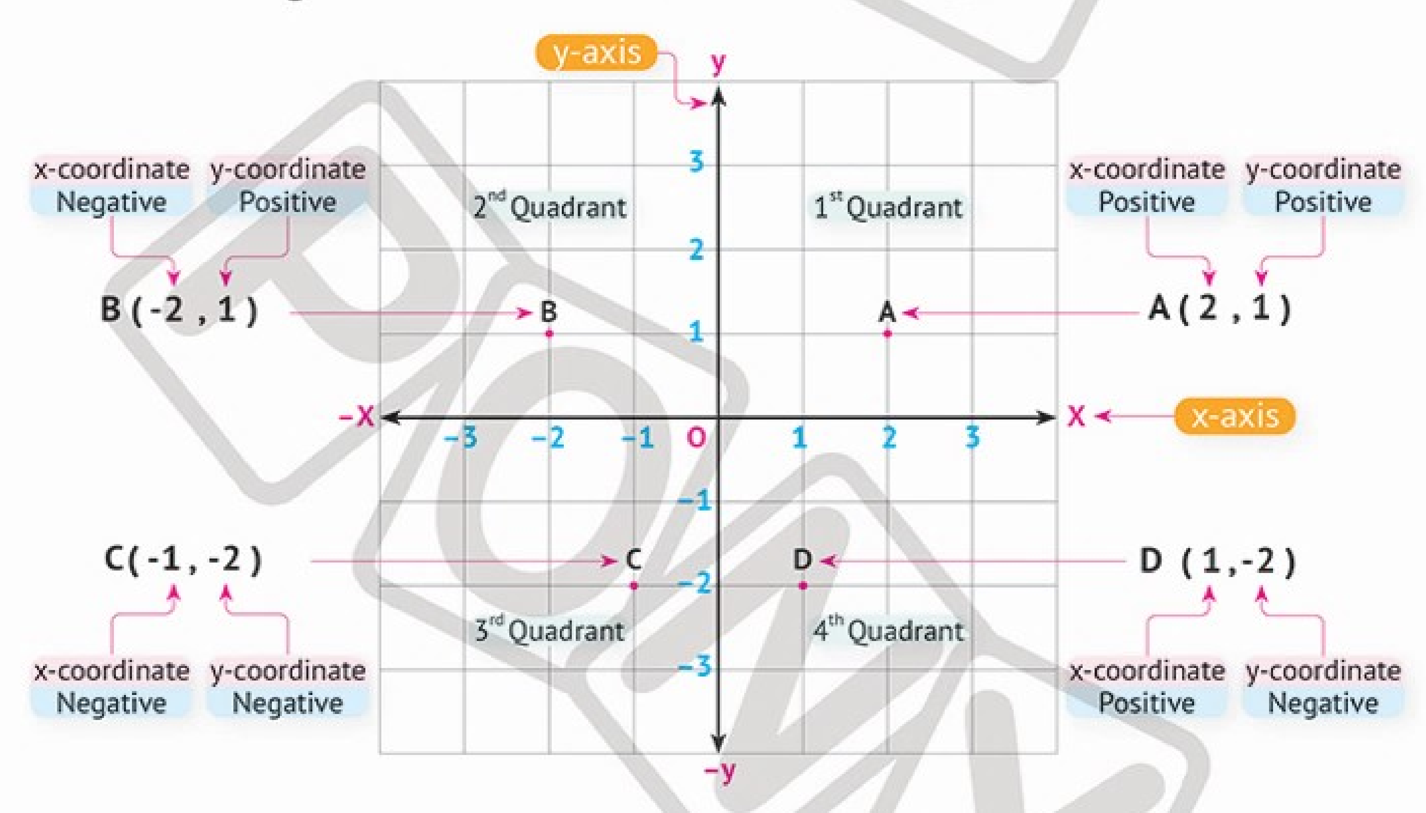
Exploring the Coordinate Plane
Analyzing the Coordinate Plane
Analyzing Points on the Coordinate Plane

The Coordinate Plane

It is a two-dimensional plane formed by the intersection of two perpendicular number lines, a horizontal line called the x-axis and a vertical line called the y-axis.

- The coordinate plane is separated into four parts.
- Each part is called a quadrant.

- **We can determine the quadrant in which the ordered pair falls through coordinate signs.**



- **(Positive , Positive) ⟶ 1st Quadrant**
- **(Negative , Positive) ⟶ 2nd Quadrant**
- **(Negative , Negative) ⟶ 3rd Quadrant**
- **(Positive , Negative) ⟶ 4th Quadrant**

1 Using the following coordinate plane:

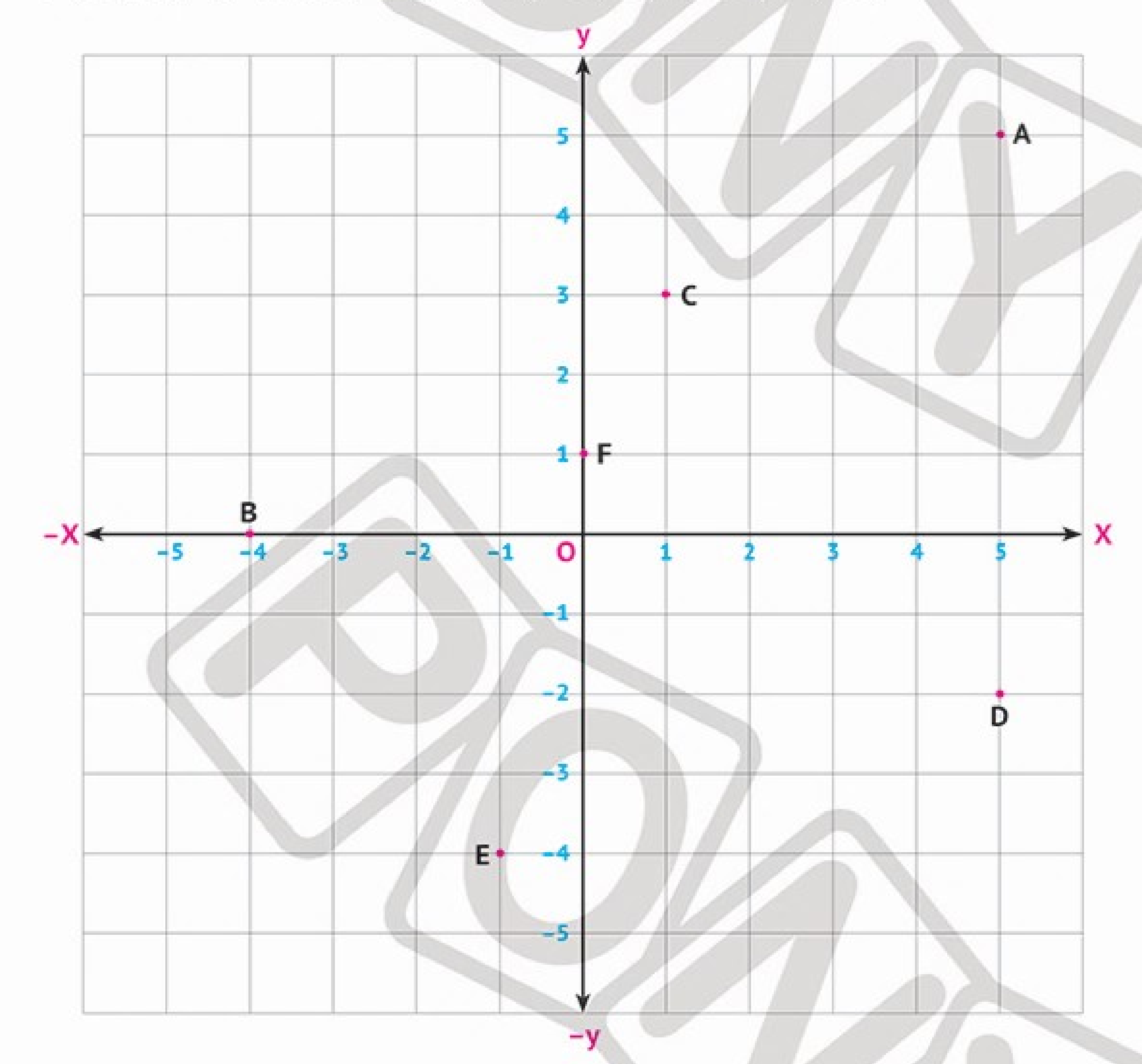
ⓐ Write the ordered pair that represents each of the following point.

A (.......... , ...)　　B (.......... , ...)　　C (.......... , ...)

D (.......... , ...)　　E (.......... , ...)　　F (.......... , ...)

ⓑ **Locate the following points:**

G (3 , 0) , H (-3 , -5) , I (-3 , 5) , J (3 , -5)



2 Determine which quadrant you can plot the ordered pair in:

ⓐ (2 , 5) ⟶ ....　　ⓑ (6 , -9) ⟶ ....

ⓒ (-3 , -7) ⟶ ....　　ⓓ (-3 , 4) ⟶ ....

ⓔ (-8 , -4) ⟶ ....　　ⓕ (-7 , 3) ⟶ ....

ⓖ (7 , 2) ⟶ ....　　ⓗ (5 , -1) ⟶ ....



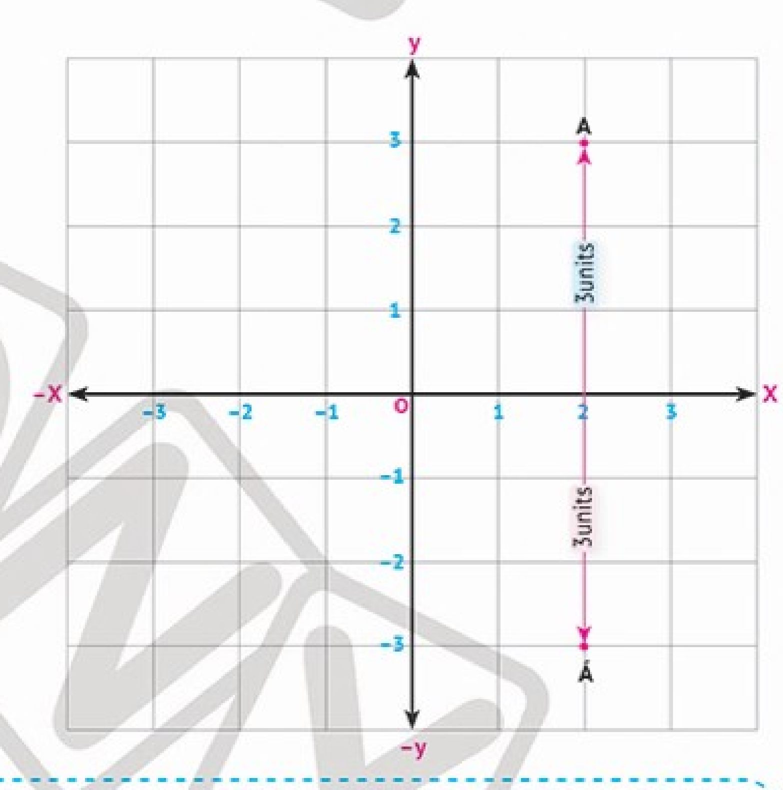
- The smaller the absolute value of the y-coordinate, the closer the point to the x-axis.
- The smaller the absolute value of the x-coordinate, the closer the point to the y-axis.
- Making the absolute values of the x and y coordinates larger moves the point farther away from the origin.
- A point on the x-axis has a y-coordinate of zero.
- A point on the y-axis has an x-coordinate of zero.
- The ordered pair representing the origin is (0 , 0).

Reflection in the coordinate plane

1 Reflect across the y-axis:

To find the reflection of point A (2 , 3) on the x-axis point (2 , 3) is 3 units away from the x-axis; therefore, place the other point 3 units away as well, but on the opposite side.

So, the image will be (2 ,-3).



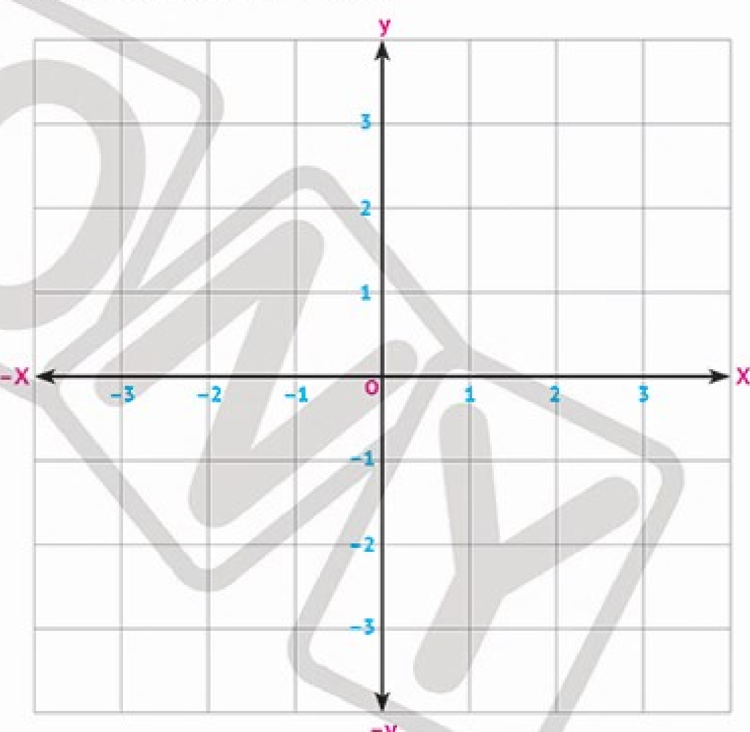


- For reflection across the x-axis, change the sign of the y-coordinate:

 (4 , 5) ⟶ (4 , – 5) , (– 4 , – 5) ⟶ (– 4 , 5)

3 **Locate the following points on the coordinate plane, then find the image of each point by reflection on the x-axis:**

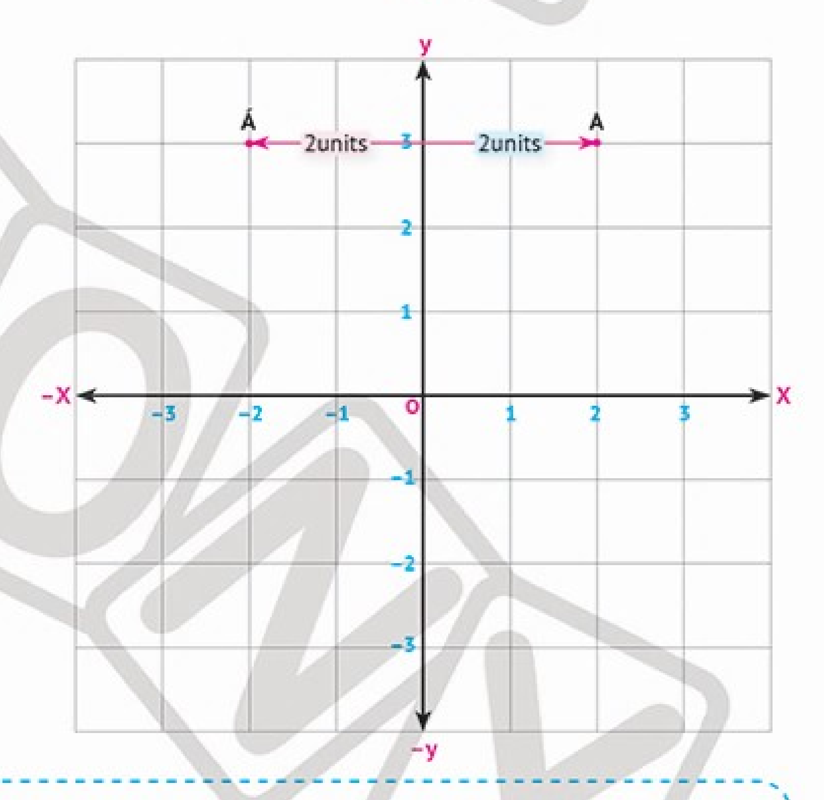
	Point	The Image of a Point by Reflection on x-axis
a	(3 , –1)	(........... , ...)
b	(2 , 3)	(........... , ...)
c	(–2 , 0)	(........... , ...)
d	(–3 , –1)	(........... , ...)
e	(1 , 3)	(........... , ...)
f	(0 , –3)	(........... , ...)
g	(0 , 0)	(........... , ...)



2 Reflect across the y-axis:

To find the reflection of point A (2 , 3) on the y-axis point (2 , 3) is 2 units away from the y-axis; therefore, place the other point 2 units away as well, but on the opposite side.

So, the image will be (-2 , 3).



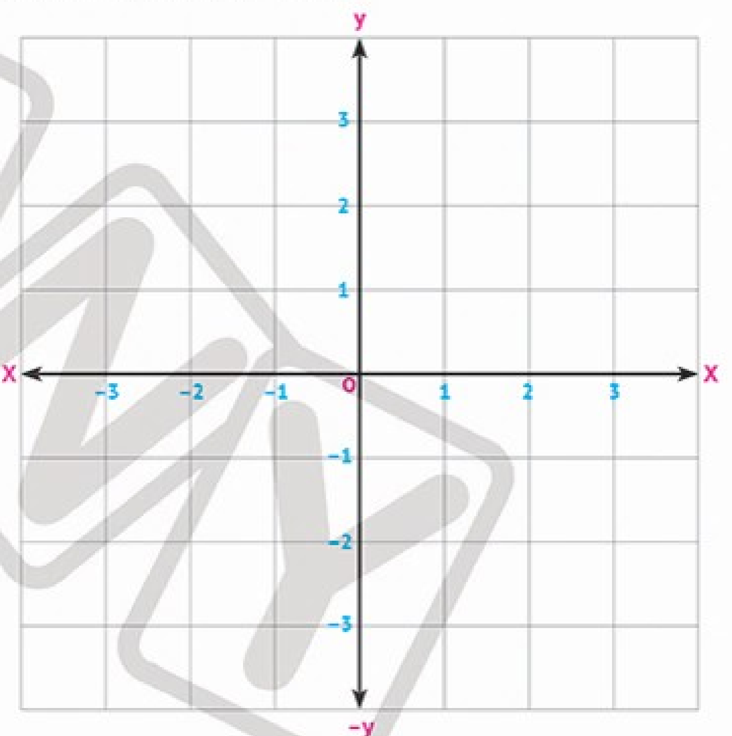


- For reflection across the y-axis, change the sign of the x-coordinate:

Ex. (4 , 5) ⟶ (– 4 , 5) , (– 4 , – 5) ⟶ (4 , – 5)

4 **Locate the following points on the coordinate plane, then find the image of each point by reflection on the y-axis:**

Point	The Image of a Point by Reflection on y-axis
a (−1 , −1)	(.............. , ...)
b (1 , 3)	(.............. , ...)
c (2 , −3)	(.............. , ...)
d (−2 , 2)	(.............. , ...)
e (1 , 0)	(.............. , ...)
f (0 , −2)	(.............. , ...)
g (0 , 0)	(.............. , ...)



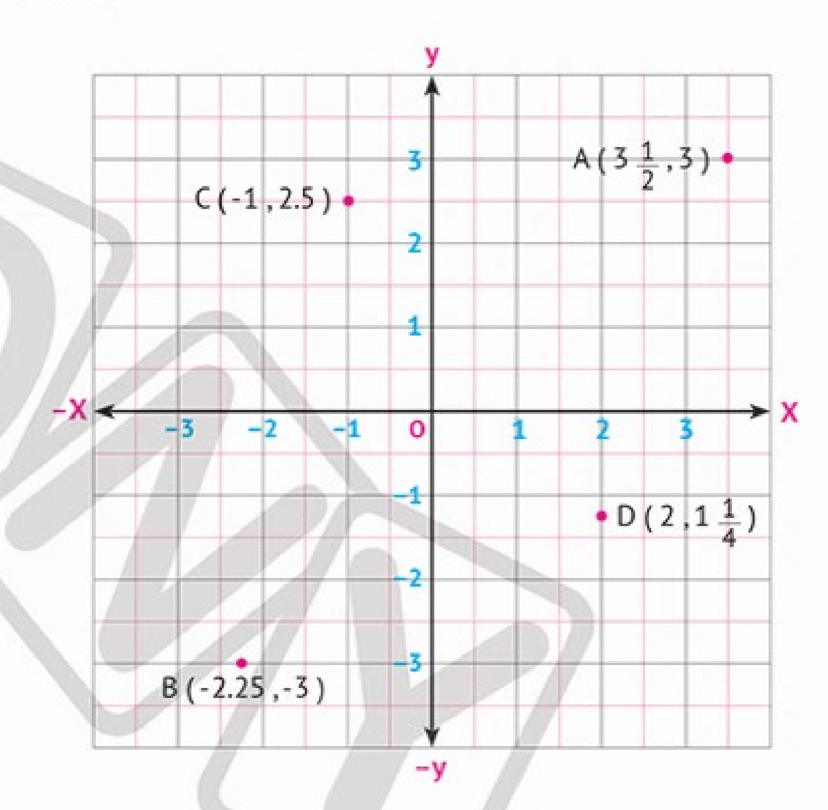
Ex. **Locate the following points:**

A $(3\frac{1}{2}, 3)$

B (- 2.25 , - 3)

C (- 1 , 2.5)

D $(2, -1\frac{1}{4})$



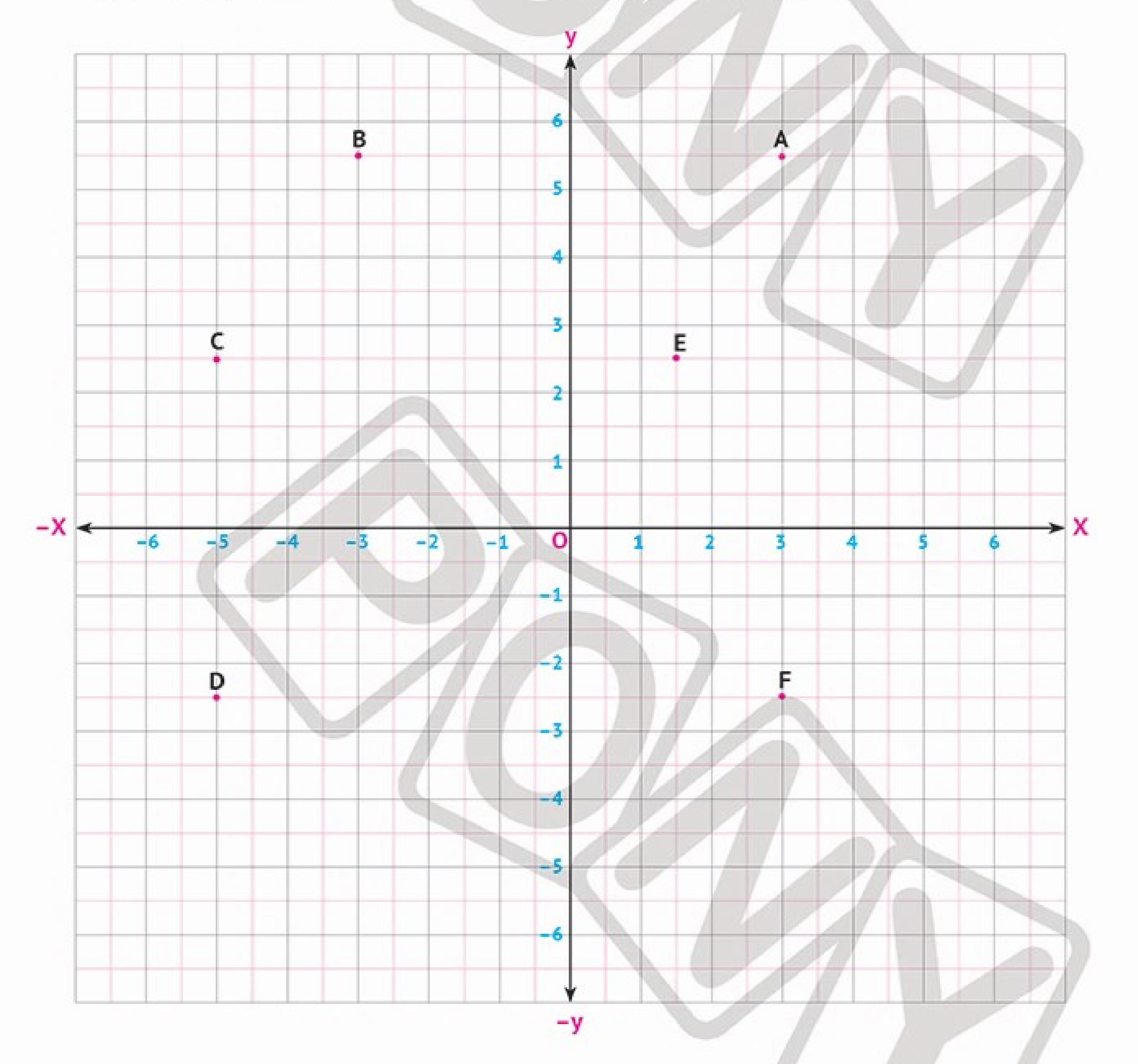
5 Using the following coordinate plane:

ⓐ Write the ordered pair that represents each of the following points.

A (………… , …………)   B (………… , …………)

C (………… , …………)   D (………… , …………)

E (………… , …………)   F (………… , …………)



ⓑ Write pairs that are reflections of each other over one of the axes.

…….



10

1 Complete the following:

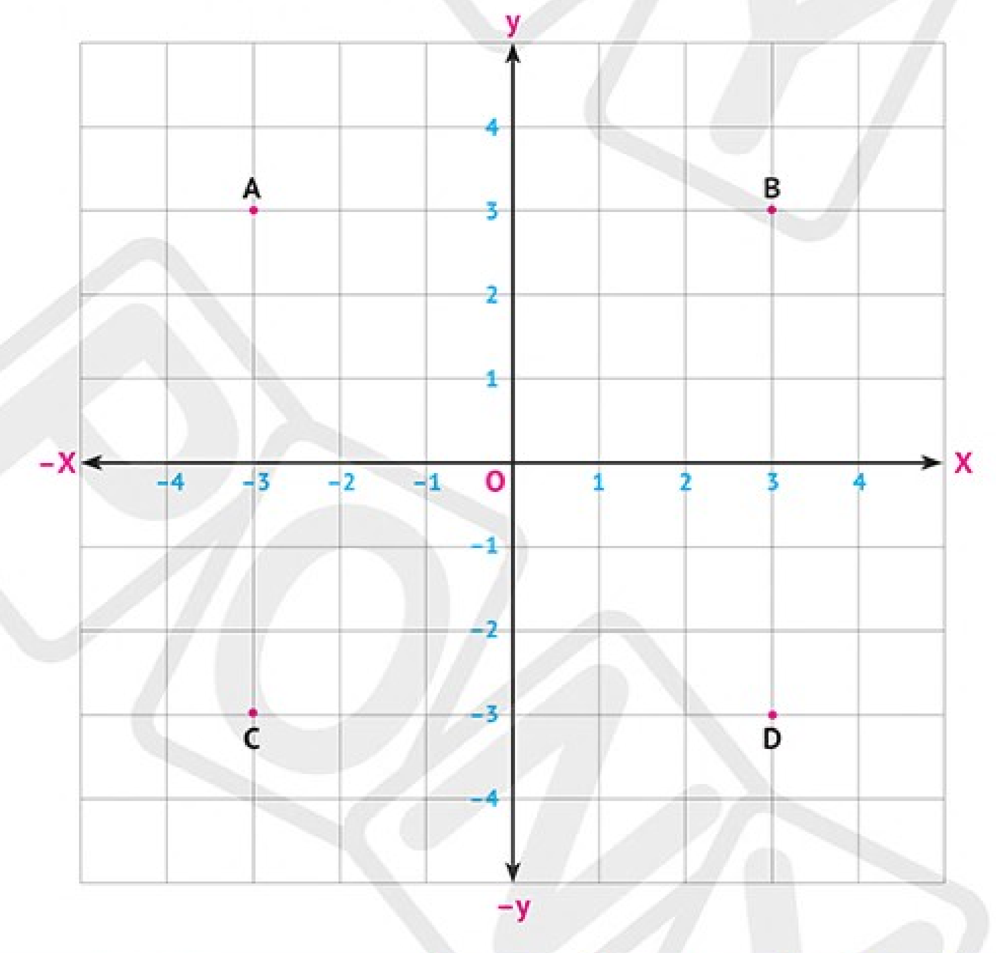
a The ordered pair representing the origin is ....

b Point (-3 , 7) is located in the quadrant ....

c Point (5 , 0) is located on the .... axis

d The image of point (-6 , 6) reflected on y-axis is the point ....

2 Using the following coordinate plane. Complete:



Point	A	B	C	D
The Image of a Point by Reflection on x-axis	....	....	....	....
The Image of a Point by Reflection on y-axis	....	....	....	....



Coordinate Plane

Concept 11.2 Use Coordinate Geometry

Lessons 4&5

Exploring the Distance between Points on a Line
Exploring Distance between Points on a Coordinate Plane

Learning Objectives:

By the end of these lessons, the student will be able to:

- Find the distance between points on a horizontal and vertical number line using understanding of absolute value
- Develop strategies for finding distance between points when x-coordinates or y-coordinates have different signs.

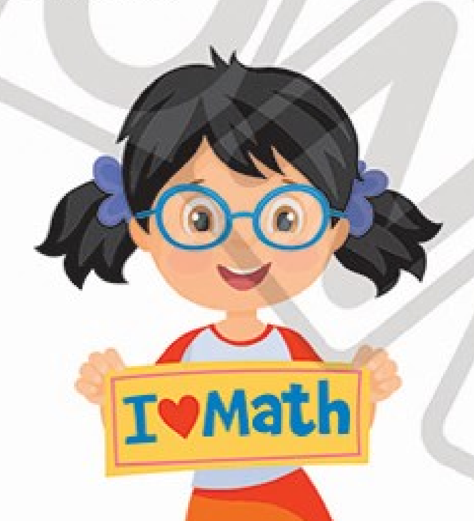
Lesson 6

Create Geometric Shapes in the Coordinate Plane

Learning Objective:

By the end of this lesson, the student will be able to:

- Draw a geometric shape in a coordinate pane knowing the coordinates of its vertices.





Exploring the Distance between Points on a Line
Exploring Distance between Points on a Coordinate Plane

Distance between Points on a Line

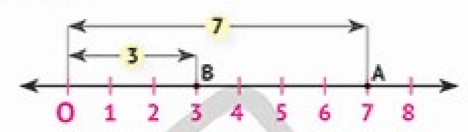
The distance is always positive, so to find the distance between two points on a number line, we use the absolute value.

1 If the two numbers have the same sign:

- Subtract the absolute values of the two numbers.

Ex. **The distance between the two points:**

ⓐ A and B



The distance between the two points A and B

= | 7 | – | 3 |

= 7 – 3 = 4 units

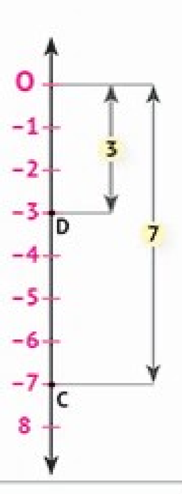
ⓑ C and D

The distance between the two points C and D

= | - 7 | – | - 3 |

= 7 – 3

= 4 units

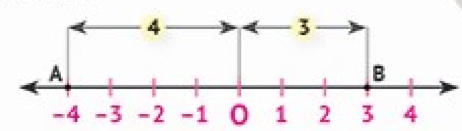


2 If the two numbers have different signs:

- Add the absolute values of the two numbers.

Ex. **The distance between the two points:**

ⓐ A and B



The distance between the two points A and B

= | –4 | + | 3 |

= 4 + 3 = 7 units

ⓑ C and D

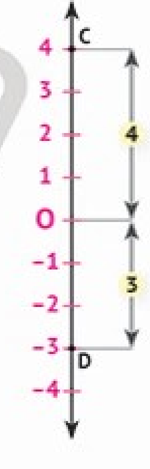
The distance between the two points C and D

= | 4 | + | –3 |



= 4 + 3

= 7 units



1 **Using the following number line, find the distance between the two points:**

ⓐ A and B = ...

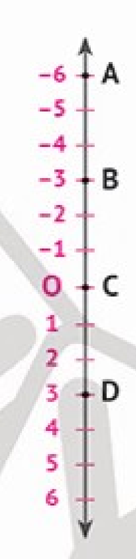
ⓑ C and D = ...

ⓒ A and C = ...

ⓓ A and D = ...

ⓔ B and C = ...

ⓕ B and D = ...



Distance Between Points on a Coordinate Plane

• **The distance between two points on the coordinate plane:**
can be found in the same way as finding the distance between two points on a number line if they have the same x-coordinate or y-coordinate.

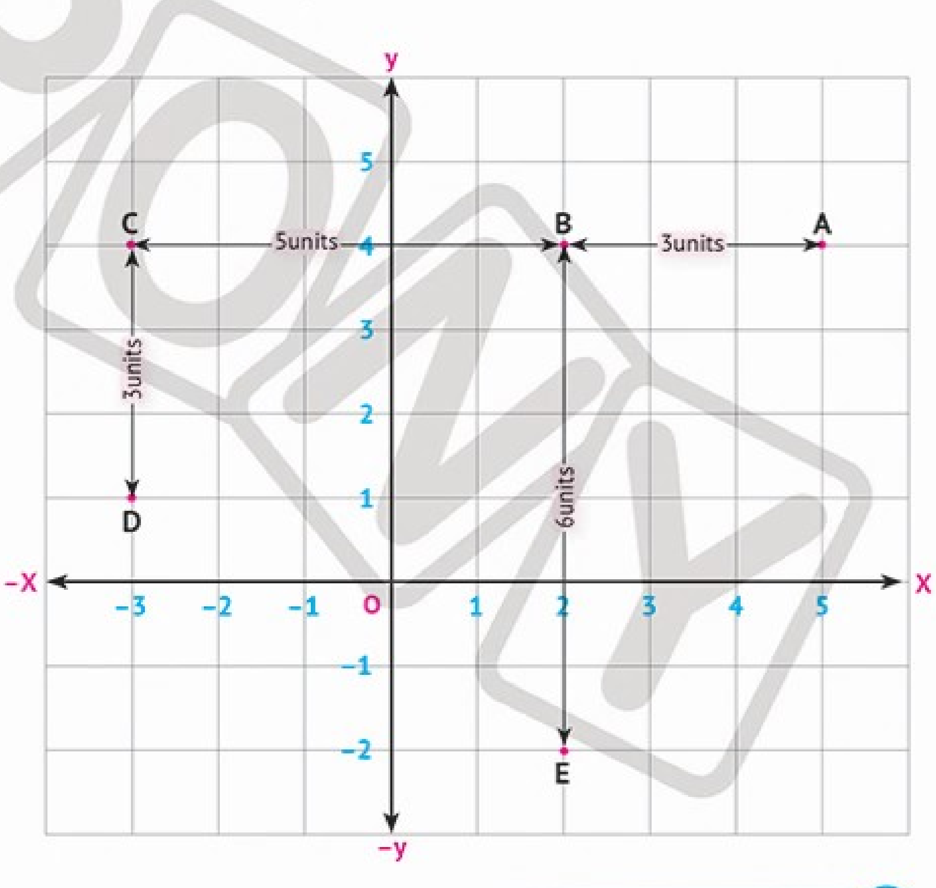
Ex. **The distance between the two points:**

ⓐ A (5 , 4) and B (2 , 4)
= | 5 | – | 2 | = 5 – 2
= 3 units

ⓑ B (2 , 4) and C (-3 , 4)
= | 2 | + | -3 | = 2 + 3
= 5 units

ⓒ C (-3 , 4) and D (-3 , 1)
= | 4 | - | 1 | = 4 - 1
= 3 units

ⓓ B (2 , 4) and E (2 , -2)
= | 4 | + | 2 | = 4 + 2
= 6 units



2 **Using the following coordinate plane, find the distance between the two points:**

First Point	A (....... , ...)	B (....... , ...)	D (....... , ...)	E (....... , ...)	A (....... , ...)
Second Point	B (....... , ...)	C (....... , ...)	E (....... , ...)	F (....... , ...)	C (....... , ...)
The Distance	.... units.	.... units.	.... units.	.... units.	.... units.



- If the points have the same x-coordinate, they lie on the same vertical line → Ex. (4 , - 5) and (4 , 3)
  If the points have the same y-coordinate, they lie on the same horizontal line. → Ex. (2 , 6) and (-3 , 6)

3 Using the following points:

(5 , 8) , (5 , - 2) , (4 , -3) , (2 , - 3) , (-5 , -3) , (5 , 3)

If point A (5 , -3), then:

The points that will lie on the same vertical line as point A are:

....

The points that will lie on the horizontal line as point A are:

....



10

1 Complete:

a) The distance between (3 , 5) and (-2 , 5) is .... units.

b) The two points (5 , ...) and (-2 , 6) lie on the same line.

c) The distance between (2 , 9) and (2 , ...) is 5 units.

2 Locate the following points on the coordinate plane:

A (3 , 5) , B (0 , 5) , C (3 , -5) , D (0 , -5)

Then find the distance between.

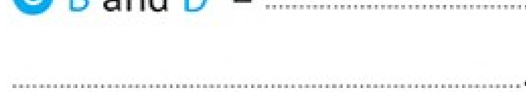


a) A and B = ...

....

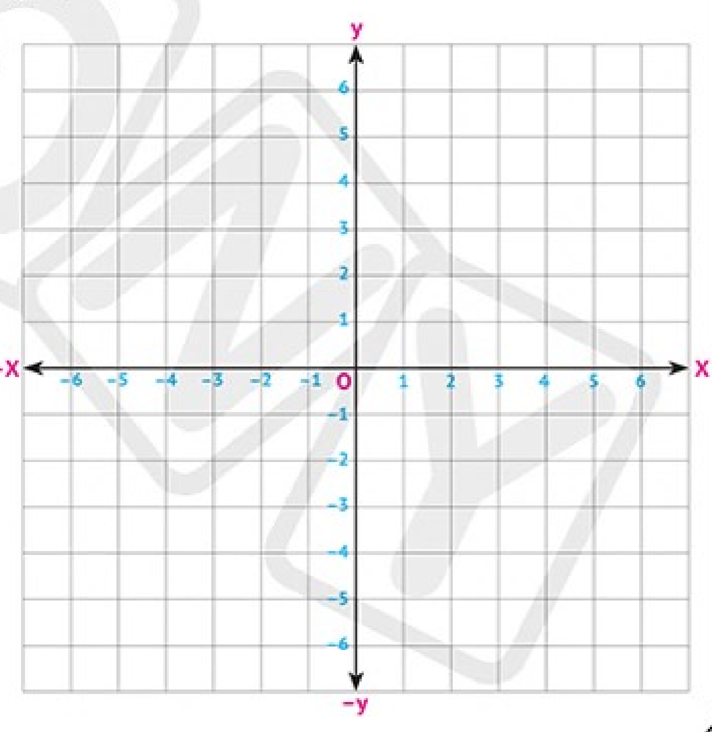
b) A and C = ...

....



c) B and D = ...

....





Create Geometric Shapes in the Coordinate Plane

- To determine the geometric shape represented by each set of points on the coordinate plane, we follow the following:

1. Plot each set of points on a coordinate plane.
2. Match each set of points together to form a geometric shape (in order).
3. Name the shape.

1 **Using graph paper, plot each set of points, calculating side lengths to aid in correctly identifying each shape.**

Then, match each set of vertices to the shape it represents.

Shape (1) : { (- 1 , 2) , (1 , - 4) , (-3 , - 4) , (- 3 , 2) }

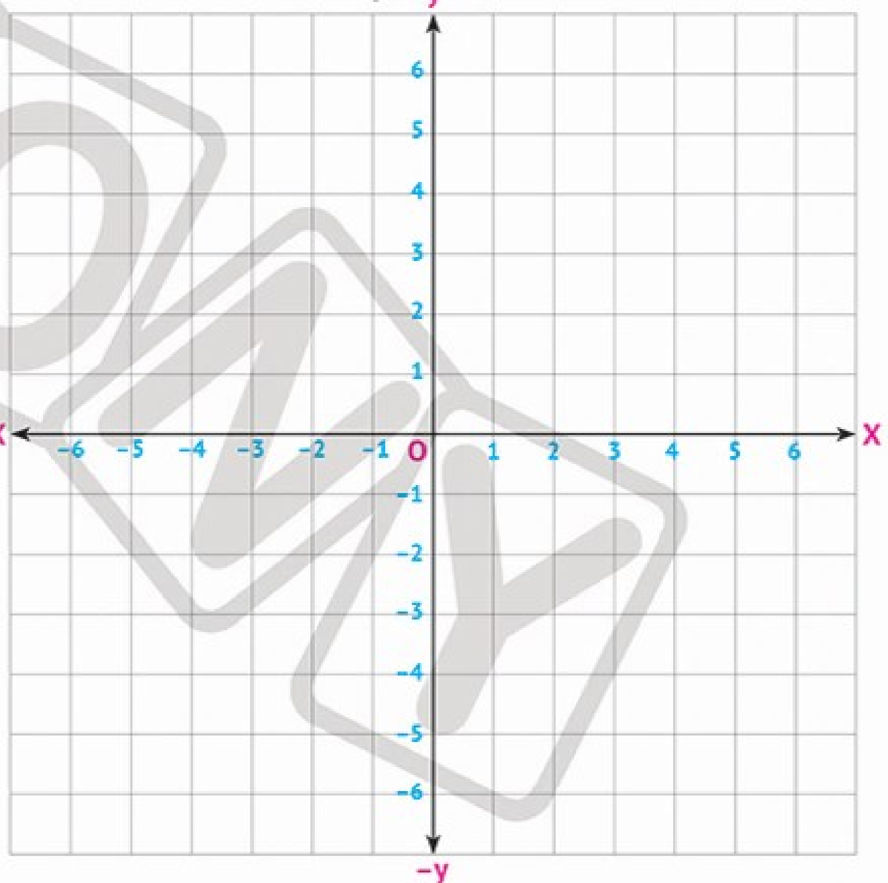
Shape (2) : { (0 , 0) , (4 , 1) , (6 , 0) }

Shape (3) : { (5 , - 2) , (5 , 1) , (2 , -2) , (2 , 1) }

Shape (4) : { (- 2 , 1) , (-2 , - 4) , (-3 , - 4) , (-3 , 1) }

Shape (5) : { (3 , - 3) , (- 1 , - 3) , (- 1 , 6) , (3 , 6) }

Shape	Name
(1)	....
(2)	....
(3)	....
(4)	....
(5)	....





1 Drawing a square:

Ex. **Match the following set of points together in order to form a geometric shape:**

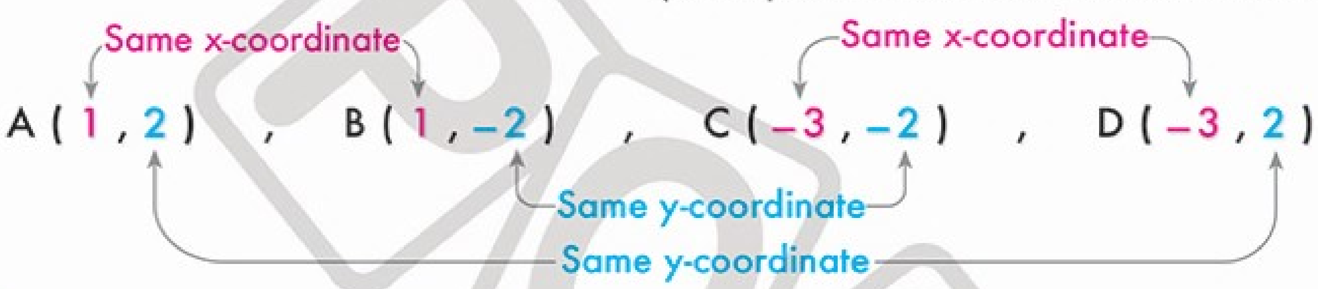
{A (1 , 2) , B (1 , -2) , C (-3 , -2) , D (-3 , 2) }

Note:

- The distance between every two consecutive points is equal.

- The distance between the two points:

- A and B is 4 units
- B and C is 4 units
- C and D is 4 units
- D and E is 4 units
- Two pairs of points lie on the same horizontal line. (each pair have the same y-coordinate)
- Two pairs of points lie on the same vertical line. (each pair have the same x-coordinate)



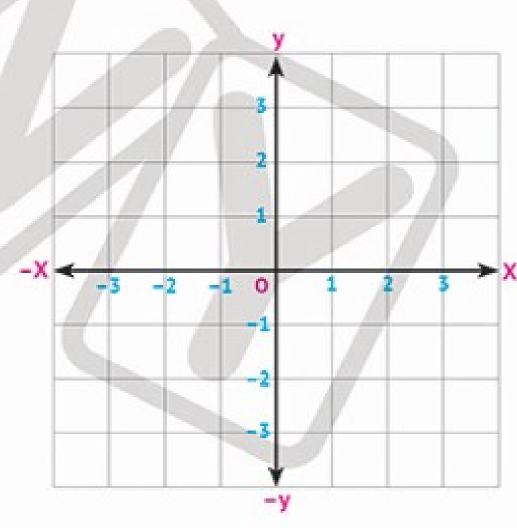
2 The point (1 , 2), plotted on the coordinate plane, is one vertex of a square with sides 3 units long.

(a) Plot three additional points on the grid to complete this square.

(b) The coordinates of the vertices of the square are:

.... , ...

.... , ...



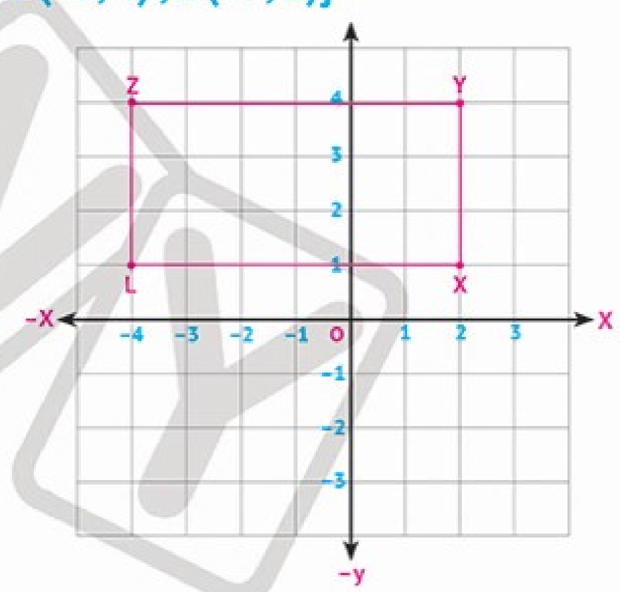
Theme 4

2 Drawing a rectangle:

Ex. **Match the following set of points together in order to form a geometric shape:**

{X (2 , 1) , Y (2 , 4) , Z (-4 , 4) , L (-4 , 1)}

Note:



- The distance between the two points:

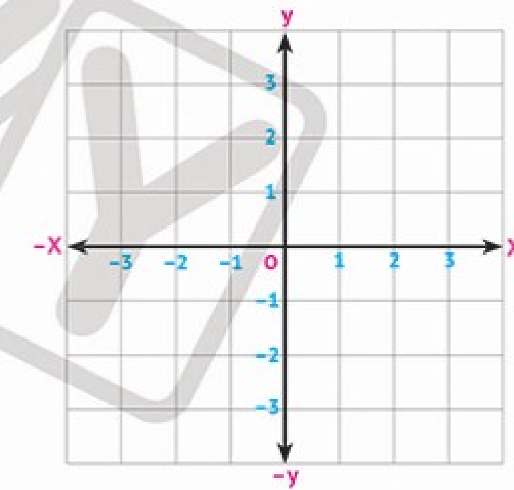
- X and Y is 3 units
  Y and Z is 6 units
- The two sides that form a right angle must have a common point.
- A pair of points must lie on the same horizontal line.
  (they have the same y-coordinate).
  A pair of points must lie on the same vertical line.
  (they have the same x-coordinate).

Same x-coordinate — Same x-coordinate

X (2 , 1) , Y (2 , 4) , Z (−4 , 4) , D (−4 , 1)

Same y-coordinate — Same y-coordinate

3 **The point (−3,−2) is one vertex of a rectangle with a length of 6 units and a width of 1 unit. Using graph paper, plot 3 additional points to complete the rectangle.**



ⓐ Plot three additional points on the grid to complete this square.

ⓑ The coordinates of the vertices of the rectangle are:

.... , ...

.... , ...

3 Drawing a right angle triangle:



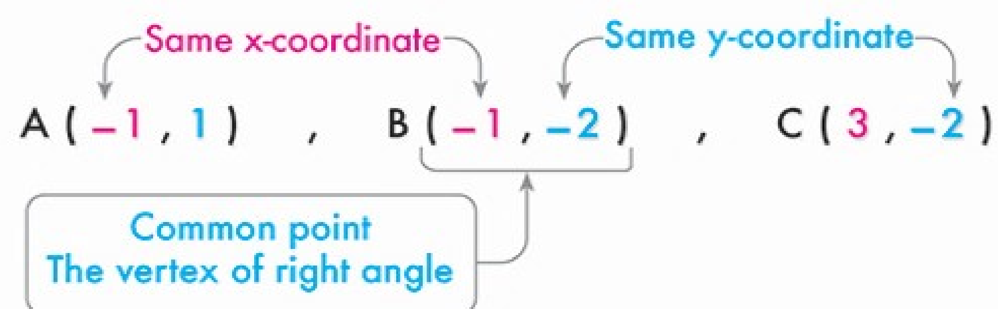
Ex. **Match the following set of points together to form a geometric shape:**



Note:

- The distance between each pair of points is equal to the distance between the corresponding points.

- **The distance between the two points:**
  - A and B is 3 units
  - B and C is 4 units
  - The two sides that form a right angle must have a common point.
  - A pair of points must lie on the same horizontal line. (they have the same y-coordinate).
  - A pair of points must lie on the same vertical line. (they have the same x-coordinate).

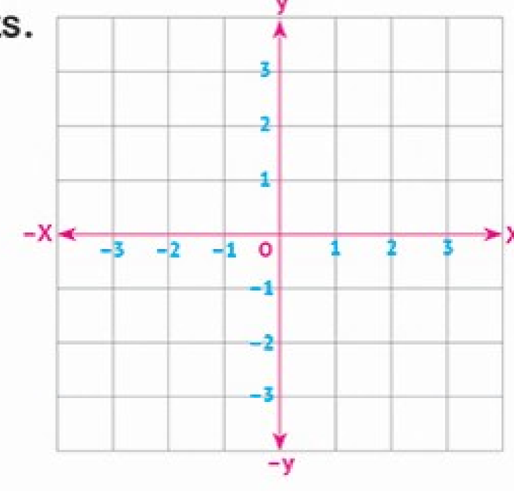


4 The point (-2 , 2) as a vertex of the right angle creates a right triangle with leg lengths of 3 units and 5 units.

ⓐ Plot two additional points on the grid to complete this square.

ⓑ The coordinates of the vertices of the triangle are:

.... , ... , ...



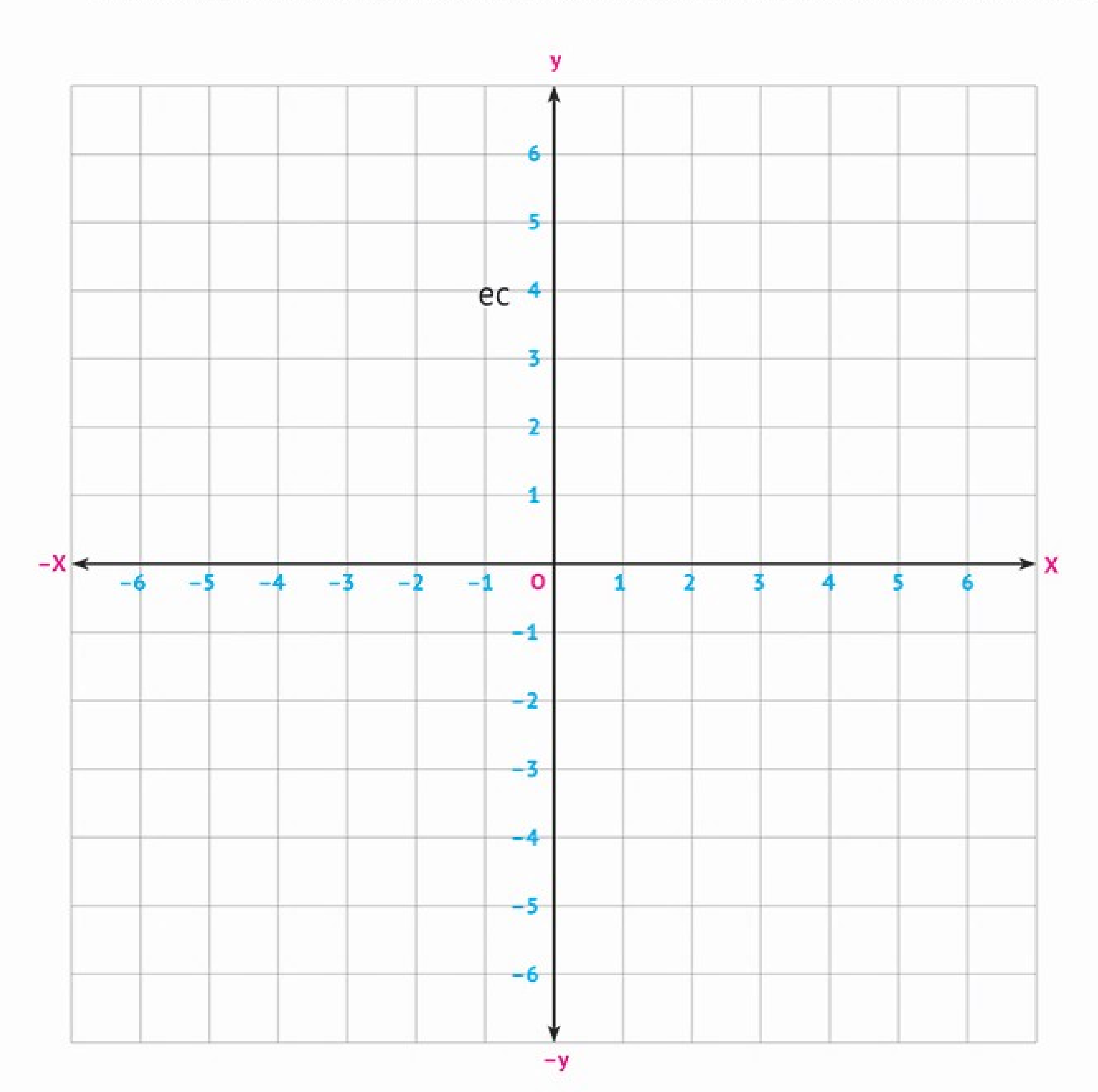
5 **Using graph paper, plot the points (4,- 6), (4 ,1), and (3 , -6), then connect them using segments.**

ⓐ Does this figure form a right angle?

....

ⓑ If yes, what are the coordinates of the vertex of the right angle?

....





10

1 Match each set of points to the shape they form when connected:

ⓐ { (2 , 5) , (2 , 2) , (5 , 2) , (5 , 5) } • • A rectangle 1

ⓑ { (-3 , 2) , (-3 , 5) , (1 , 2) } • • A square 2

ⓒ { (1 , 1) , (1 , -1) , (5 , -1) , (5 , 1) } • • A triangle 3

2 Complete the coordinates to get the figure shown:

ⓐ Square → { (2 , ...) , (2ec 4) , (...... , 4) , (5 , 1) }

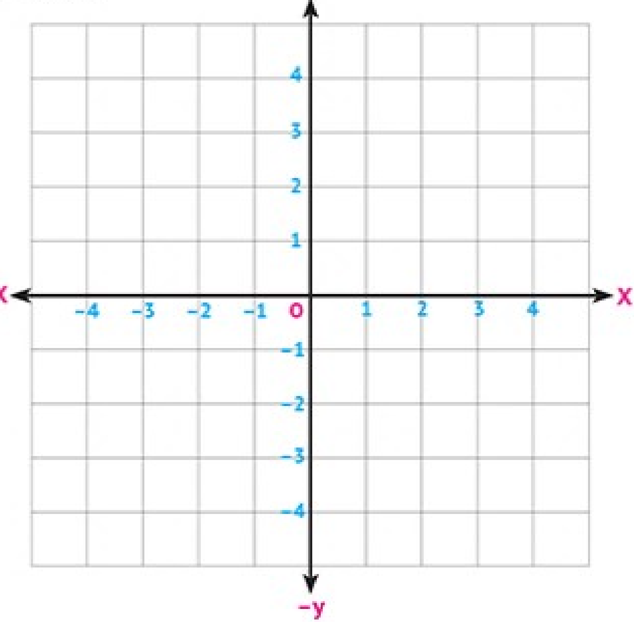
ⓑ Rectangle → { (1 , - 1) , (...... , -2) , (-3 , -2) , (...... , ...) }

ⓒ Right triangle → { (-3 , 5) , (-3 , 2) , (1 , ...) }

3 (1 , 1) and (4 , 1) are the coordinates of two consecutive points of a square.

ⓐ Plot these points on the grid and complete this square.

ⓑ The side length of the square is ....





Area of Some Polygons



Find Area of Parallelogram, Triangle, and Trapezium

Lesson 1 — Area of Parallelogram

Learning Objective:

By the end of this lesson, the student will be able to:

- Practice finding height and base, and then use a formula to calculate the area of parallelograms.

Lessons 2&3 — Area of the Triangle

Learning Objectives:

By the end of these lessons, the student will be able to:

- Determine the areas of right triangles using a formula.
- Explore how the formula used to calculate the areas of right triangles can be used on any triangle.
- Explore heights and bases of acute and obtuse triangles
- Discover the area of acute and obtuse triangles by using a formula.

Lesson 4 — Exploring Area of Trapezium

Learning Objective:

By the end of this lesson, the student will be able to:

- Discover the area of a trapezium using composition and decomposition.







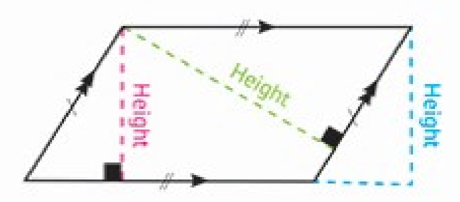
Area of Parallelogram

Parallelogram

It is a quadrilateral with two pairs of parallel sides.

1 Height of a parallelogram "h":

- It is the length of the perpendicular line segment from one side to the opposite side.



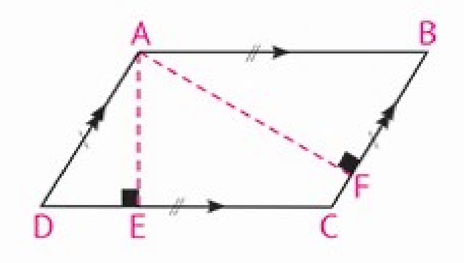
2 Base of a parallelogram "b":

- Any side of a parallelogram can be a base.
- For every base of a parallelogram, there is a corresponding height.

Ex. **In the following shape:**
ABCD is a parallelogram.

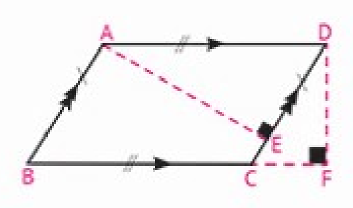
ec

Base	Corresponding Height
$\overline{AB}$ or $\overline{CD}$	$\overline{AE}$
$\overline{AD}$ or $\overline{CB}$	$\overline{AF}$

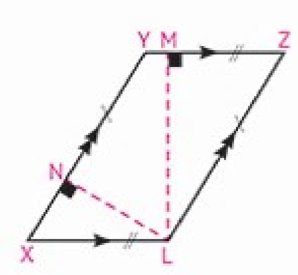


1 **Determine each base and corresponding height in each parallelogram:**

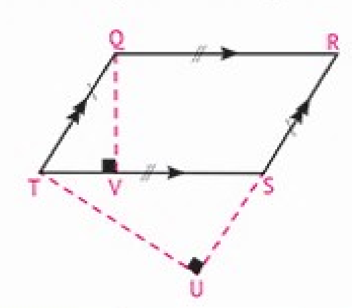
ⓐ



ⓑ



ⓒ



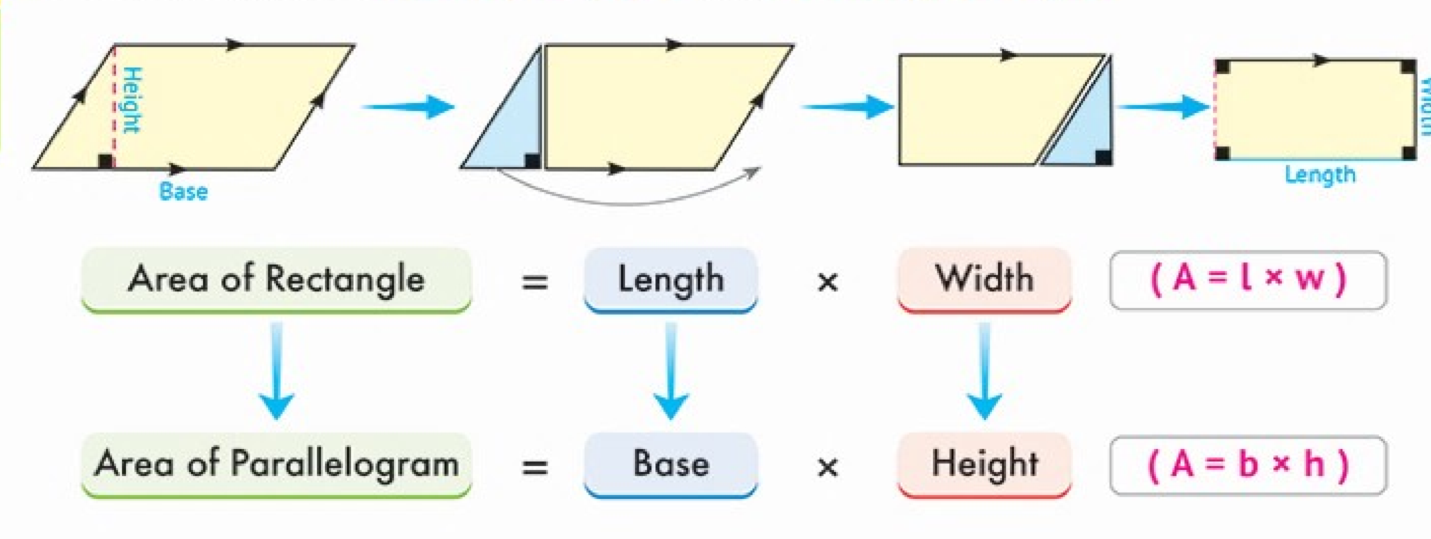
Base	Corresponding Height
$\overline{AB}$	....
$\overline{BC}$	....
$\overline{AD}$	....

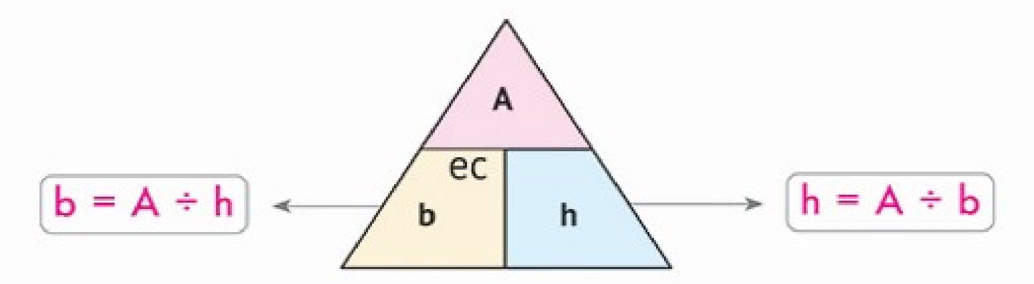
Base	Corresponding Height
...... or	$\overline{LM}$
$\overline{XY}$	....
$\overline{LZ}$	....

Base	Corresponding Height
...... or	$\overline{QV}$
$\overline{SR}$	....
$\overline{QT}$	....

3 Area of a parallelogram:

- A rectangle is a parallelogram with one right angle.





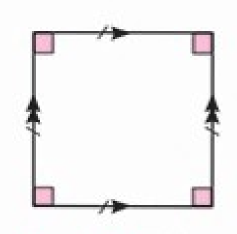
Important Notes:

- We must use the base and its corresponding height to find the area of the parallelogram.
- The larger base of the parallelogram corresponds to the smaller height, and vice versa.
- Area is measured in square units, such as square centimeters (cm^2) and square meters (m^2), etc.

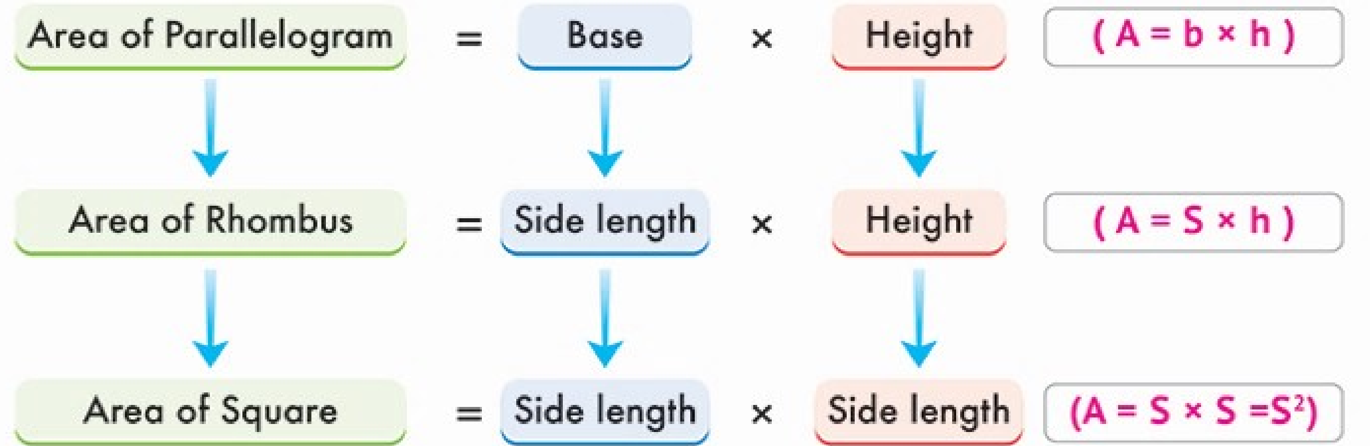
4 Area of a rhombus:

- A rhombus is a special case of a parallelogram with sides that are all equal in length.
- **Therefore,** the two heights of the rhombus are equal in length.

5 Area of a square:



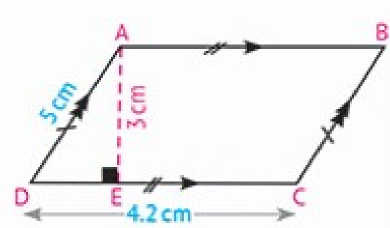
- A square is a rhombus with 4 right angles.



Ex. **Find the area of each of the following:**



ⓐ

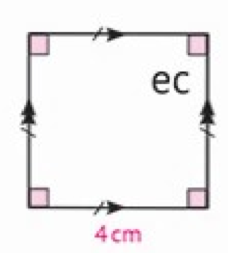


$A = b \times h$

$= 4.2 \times 3$

$= 12.6\ cm^2.$

ⓑ

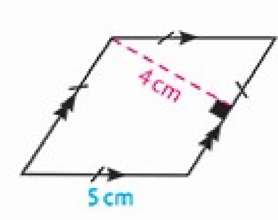


$A = S \times S$

$= 4 \times 4$

$= 16\ cm^2.$

ⓑ



$A = S \times h$

$= 5 \times 4$

$= 20\ cm^2.$

2 Find the area of each parallelogram:



ⓐ ⓑ ⓒ ⓓ



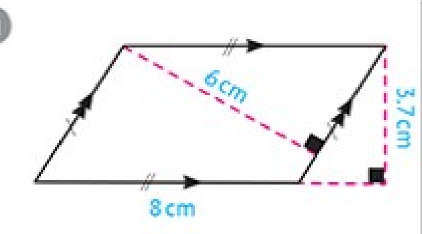
ⓐ A = ...
= .... sq. units.

ⓑ A = ...
= .... sq. units.

ⓒ A = ...
= .... sq. units.

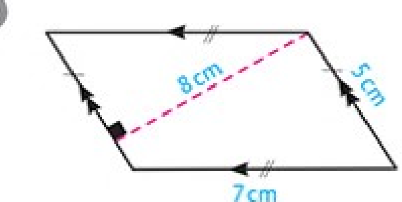
ⓓ A = ...
= .... sq. units.

3 Find the area of each of the following:

a


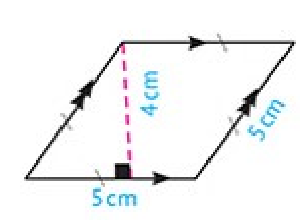
A = ...

= .... cm².

b


A = ...

= .... cm².

c


A = ...

= .... cm².



/10

1 Complete:

a) If the longer height of a parallelogram is 6 cm and the length of the ec two bases is 5 cm and 8 cm, then the the area is .... cm².

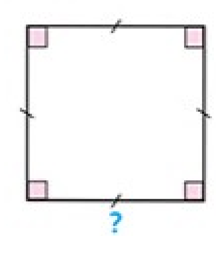
b) A .... is a special case of a parallelogram with sides that are all equal in length.

c) Area of the parallelogram = ... × ....

d) If the area of a parallelogram is 36 cm² and the length of one of its sides is 9 cm, then the length of the corresponding height is .... cm.

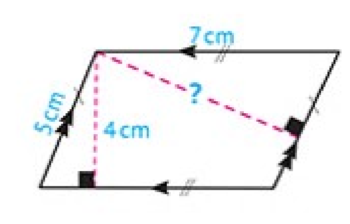
2 Find the length of the missing side:

a) Area = 9 cm².



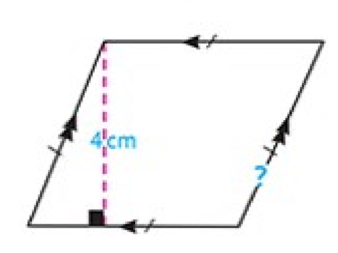
....

b) Area = 28 cm².



....

c) Area = 24 cm².



....



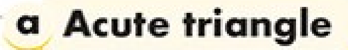
Area of the Triangle

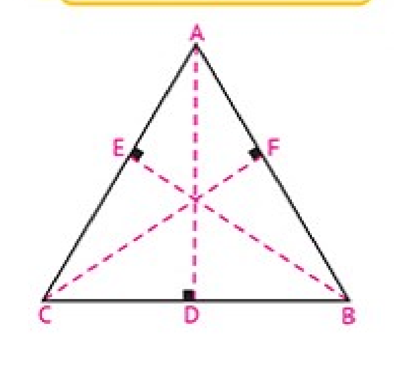
Triangle

It is a two-dimensional shape with 3 sides.

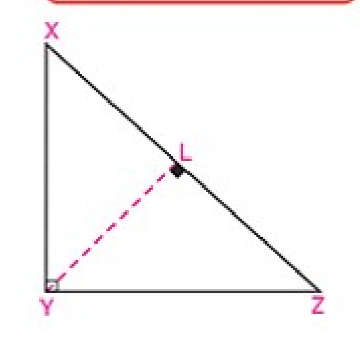
1 Height of a triangle:

- It is the length of the perpendicular line segment from one vertex of the triangle to the opposite side.
- The heights of the:

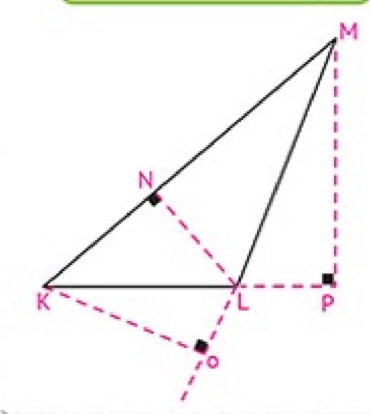








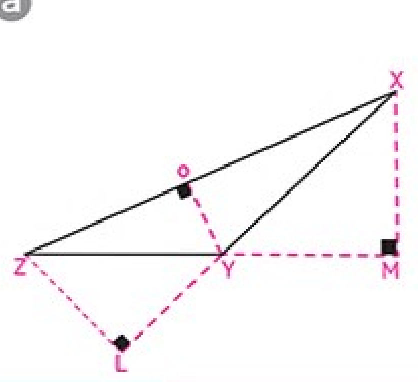
c Obtuse triangle



Base	Corresponding Height	Base	Corresponding Height	Base	Corresponding Height
$\overline{AB}$	$\overline{CF}$	$\overline{XZ}$	$\overline{YL}$	$\overline{KM}$	$\overline{LN}$
$\overline{BC}$	$\overline{AD}$	$\overline{XY}$	$\overline{YZ}$	$\overline{KL}$	$\overline{MP}$
$\overline{AC}$	$\overline{BE}$	$\overline{YZ}$	$\overline{XY}$	$\overline{ML}$	$\overline{KO}$

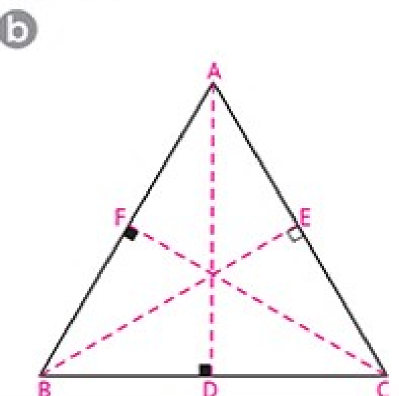
1 Determine each **base** and its **corresponding height** in each of the following triangles:

(a)



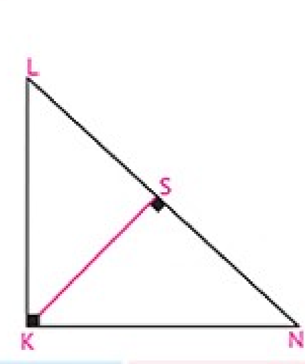
Base	Corresponding Height
$\overline{XY}$	....
$\overline{YZ}$	....
$\overline{XZ}$	....

(b)



Base	Corresponding Height
....	$\overline{AD}$
....	$\overline{BE}$
....	$\overline{CF}$

(c)



Base	Corresponding Height
....	$\overline{KN}$
$\overline{KL}$	....
....	$\overline{LN}$

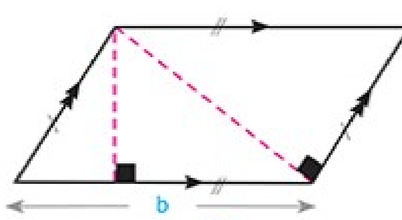
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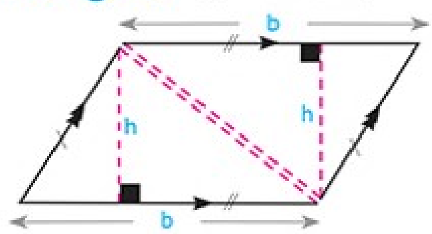


- Any triangle has 3 heights.
- The heights of an acute triangle always intersect inside the triangle.
- The two sides that form a right angle in a right triangle represent the two heights of the triangle.

2 Area of a triangle:

1 A formula for calculating the area of a triangle can be derived by dividing a parallelogram into two triangles, as follows:

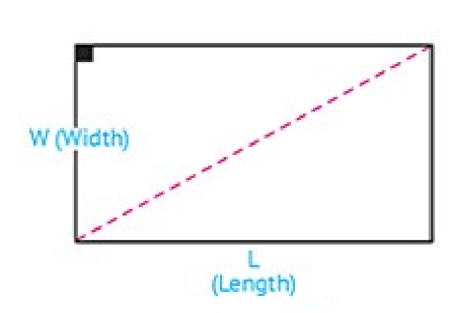


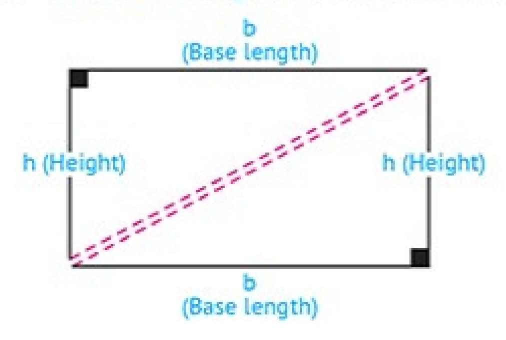


- Area of the triangle = $\frac{1}{2}$ the area of the parallelogram.
- Area of the triangle = $\frac{1}{2} \times$ Base $\times$ Height ($A = \frac{1}{2} \times b \times h$)

(We must use the base and its corresponding height.)

2 A formula for calculating the area of a right triangle can be derived by dividing a rectangle into two triangles, as follows:





- Area of the triangle = $\frac{1}{2}$ the area of the rectangle.
- Area of the triangle = $\frac{1}{2}$ × (Length × Width) $\left(A = \frac{1}{2} \times l \times w\right)$
- Area of the triangle = $\frac{1}{2}$ × Base × Height $\left(A = \frac{1}{2} \times b \times h\right)$

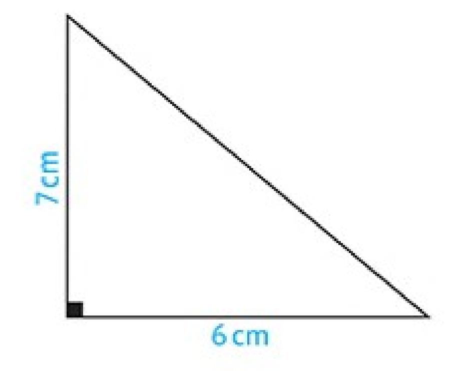
(We must use the base and its corresponding height.)

$$b = \frac{2\,A}{h}$$

ec

$$h = \frac{2\,A}{b}$$

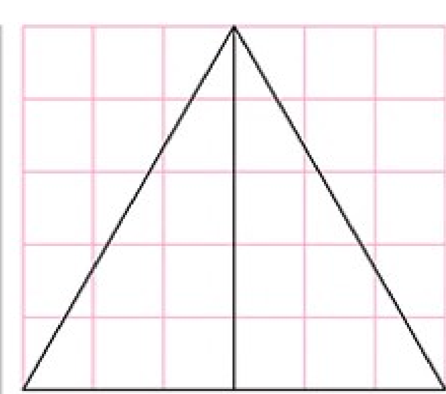
Ex. Find the area of each of the following triangles:



$A = \frac{1}{2} \times b \times h$

$= \frac{1}{2} \times 6 \times 7$

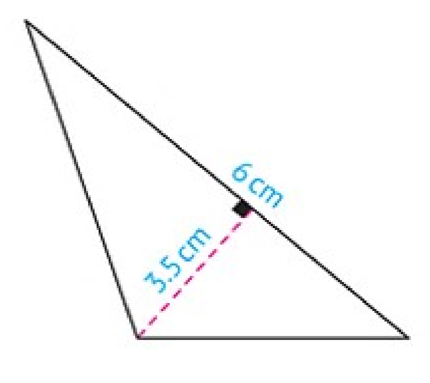
$= 21\ cm^2$.



$A = \frac{1}{2} \times b \times h$

$= \frac{1}{2} \times 5 \times 6$

= 15 sq. units.



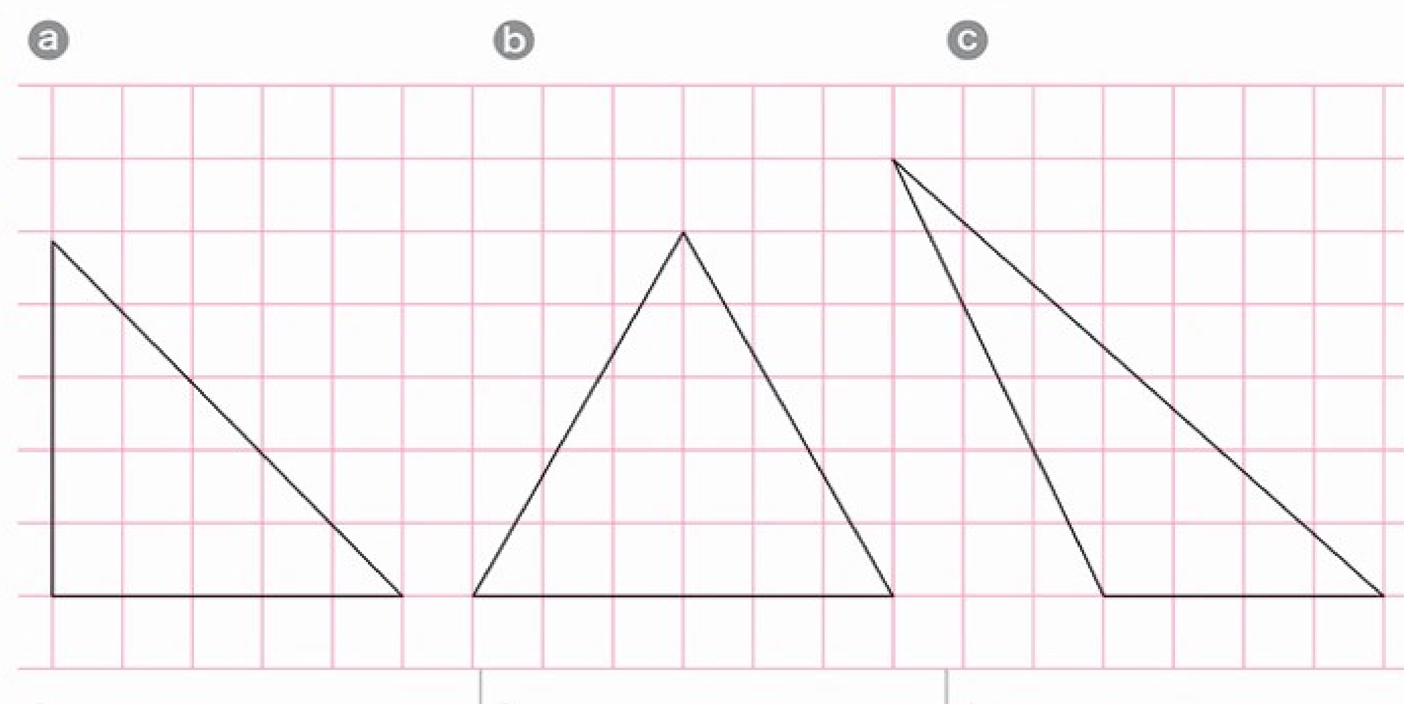
$A = \frac{1}{2} X\ b\ X\ h$

$= \frac{1}{2} X\ 6\ X\ 3.5$

$= 10.5\ cm^2$.

2 Find the area of each of the following triangles:

a b c





A = ...

= .... sq. units.



A = ...

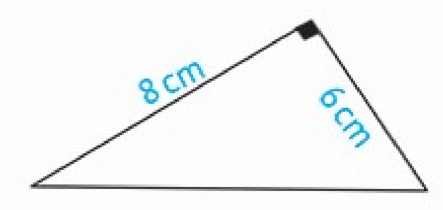
= ec .... sq. units.



A = ...

= .... sq. units.

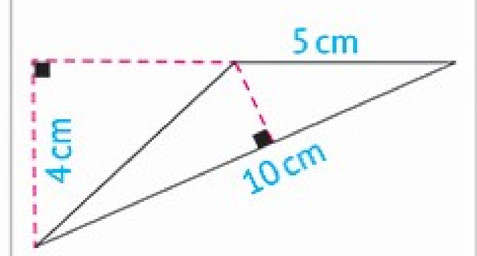
d



A = ...

= .... cm².

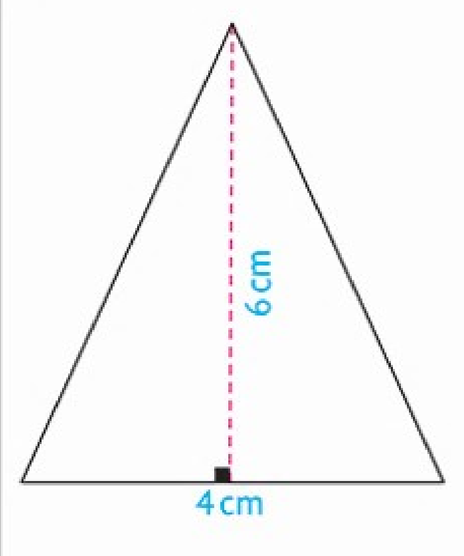
e



A = ...

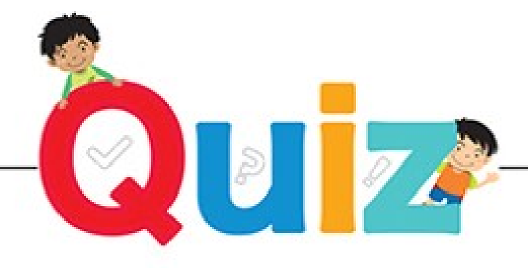
= .... cm².

f



A = ...

= .... cm².



/ 10

1 Complete:

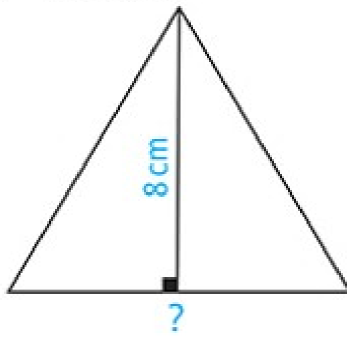
a) If the height of a triangle is 6 cm and the length of its corresponding base is 5 cm, then the area is .... cm^2.

b) If the area of a right triangle is 20 cm^2 and the length of one side of the right triangle is 5 cm, then the length of the other side is ....

c) Area of the triangle = ... × ....

2 Find the length of the missing side:

a) Area = 18 cm^2.

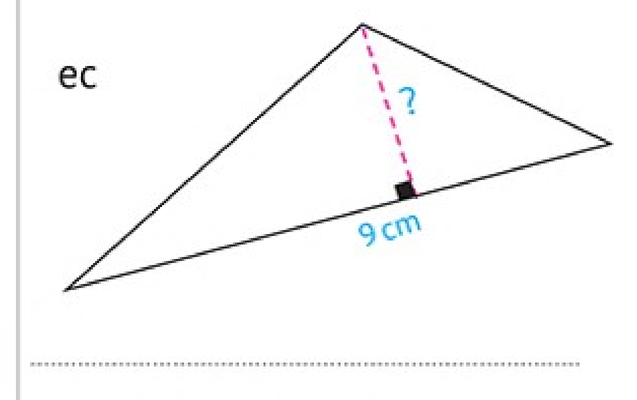


....

....

b) Area = 27 cm^2.

ec

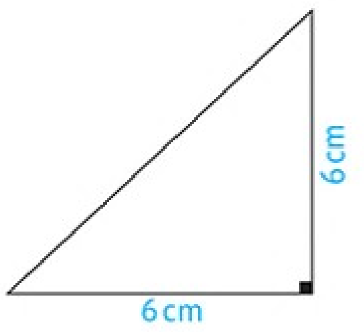


....

....

3 Find the area of each of the following:

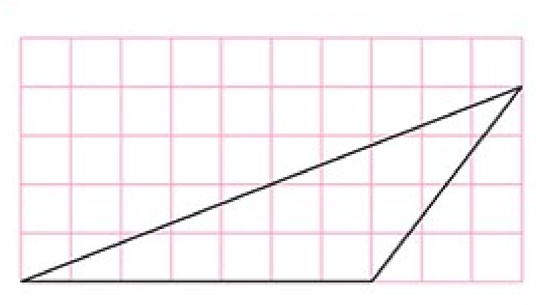




A = ...

= .... cm^2.

b)



A = ...

= .... sq. units.



Exploring Area of Trapezium

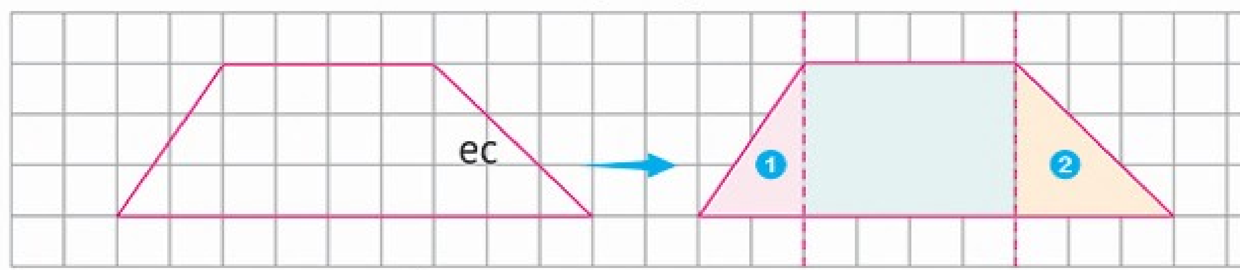
Trapezium

It is a quadrilateral with only one pair of parallel sides.

First: Area of a Trapezium Using Decomposition

1. Divide the trapezium into a rectangle and one or two right triangles.
2. Calculate the area of each shape separately.
3. Add the area of all shapes to get the area of the trapezium.

Ex. **Find the area of the following trapezium:**



- Area of triangle (1) $= \frac{1}{2} \times 2 \times 3 = 3$ square units.
- Area of triangle (2) $= \frac{1}{2} \times 3 \times 3 = 4.5$ square units.
- Area of the rectangle $= 4 \times 3 = 12$ square units.

- Area of the trapezium $= 3 + 4.5 + 12 = 19.5$ square units.

1 **Find the area of each of the following trapeziums using decomposition:**

ⓐ Area of triangle (1)

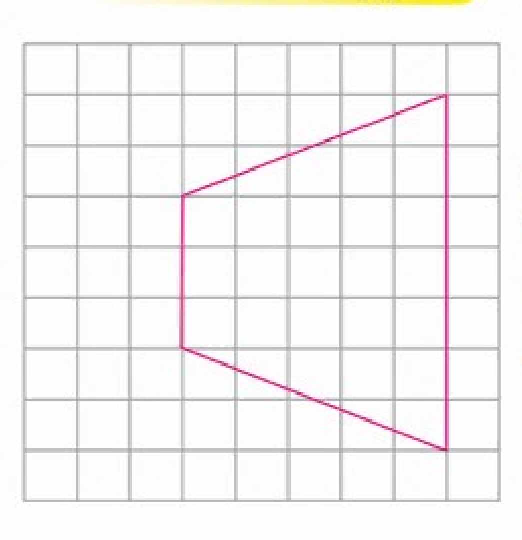
= .... units².

Area of triangle (2)

= .... units².

Area of the square = ... units².

Area of the trapezium = ... units².



ⓑ Area of triangle (1)

= .... units².

Area of triangle (2)

= .... units².

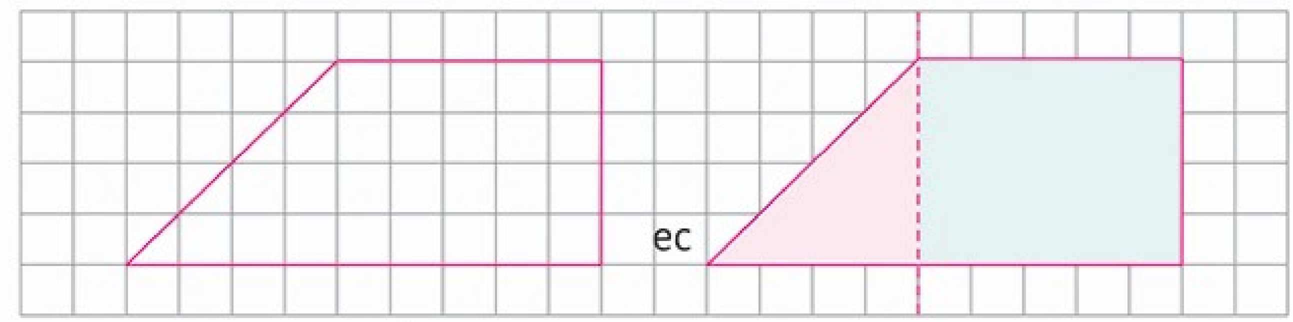
Area of the rectangle

= .... units².

Area of the trapezium

= .... units².

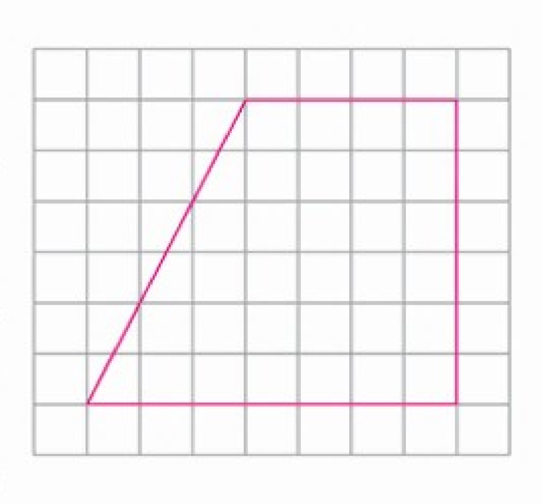
Ex. **Find the area of the following trapezium:**



- Area of the triangle = $\frac{1}{2} \times 4 \times 4 = 8$ square units.
- Area of the rectangle = $5 \times 4 = 20$ square units.

- Area of the trapezium = $20 + 8 = 28$ square units.

2 **Find the area of each of the following trapeziums using decomposition:**



Area of the triangle

= .... units².

Area of the rectangle

= .... units².

Area of the trapezium

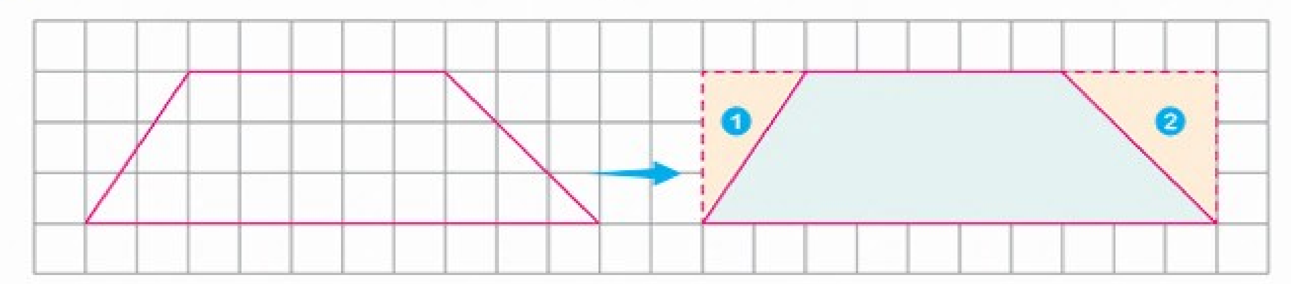
= .... units².

Theme 4

Second: Area of a Trapezium using Composition

1. Complete the shape to form a rectangle.
2. Calculate the area of the rectangle.
3. Calculate the area of the triangle(s) that were added.
4. Subtract the area of the triangle(s) from the area of the rectangle to get the area of the trapezium.

Ex. **Find the area of the following trapezium:**



- Area of the rectangle = 10 × 3 = 30 square units.
- Area of triangle (1) $= \frac{1}{2} \times 2 \times 3 = 3$ square units.
- Area of triangle (2) $= \frac{1}{2} \times 3 \times 3 = 4.5$ square units.

- Area of the trapezium = 30 – (3 + 4.5) = 22.5 square units.

3 **Find the area of each of the following trapeziums using composition:**

(a) Area of the rectangle

= .... units².

Area of triangle (1)

= .... units².

Area of triangle (2)

= .... units².

Area of the trapezium = ... units².



ⓑ Area of the rectangle

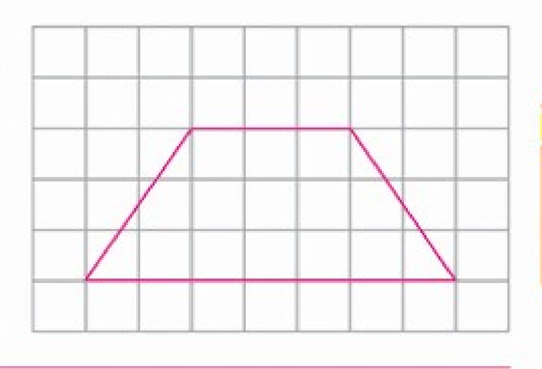
= .... units².

Area of triangle (1)

= .... units².

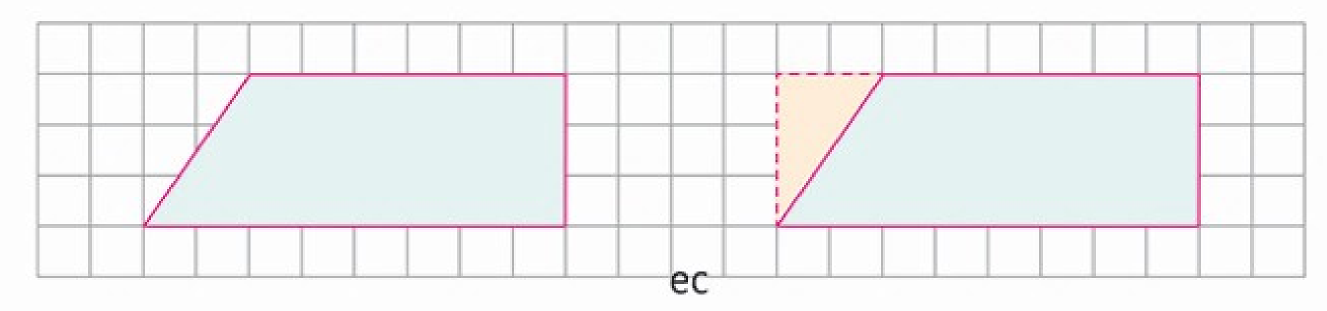
Area of triangle (2)

= .... units².



Area of the trapezium = ... units².

Ex. **Find the area of the following trapezium:**



ec

- Area of the rectangle = $8 \times 3 = 24$ square units.
- Area of the triangle = $\frac{1}{2} \times 2 \times 3 = 3$ square units.
- Area of the trapezium = $24 - 3 = 21$ square units.

4 **Find the area of each of the following trapeziums using composition:**

Area of the rectangle = ...

= .... units².

Area of the triangle = ...

= .... units².



Area of the trapezium = ... units².



$\frac{}{10}$

Find the area of each of the following trapeziums in two ways:

a

First Way: ec

....

....

....

....

....

Second Way:

....

....

....

....

....

b

First Way:

....

....

....

....

....

Second Way:

....

....

....

....

....



Surface Area and Volume



Use Nets to Find Surface Area



Surface Area of Cuboid

Learning Objective:

By the end of this lesson, the student will be able to:

- Use models to find surface area of the cuboid.

Lesson 2

Exploring Surface Area of Prism and Pyramid

Learning Objective:

By the end of this lesson, the student will be able to:

- Use nets to find the surface area of triangular prisms and square pyramids.



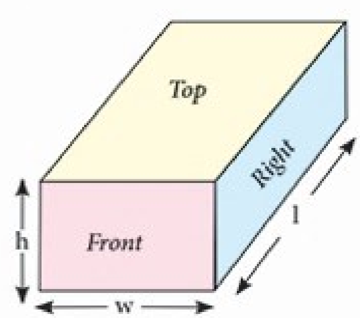


Surface Area of Cuboid

A cuboid

It is a three-dimensional shape with six rectangular faces, each two opposite faces are congruent:

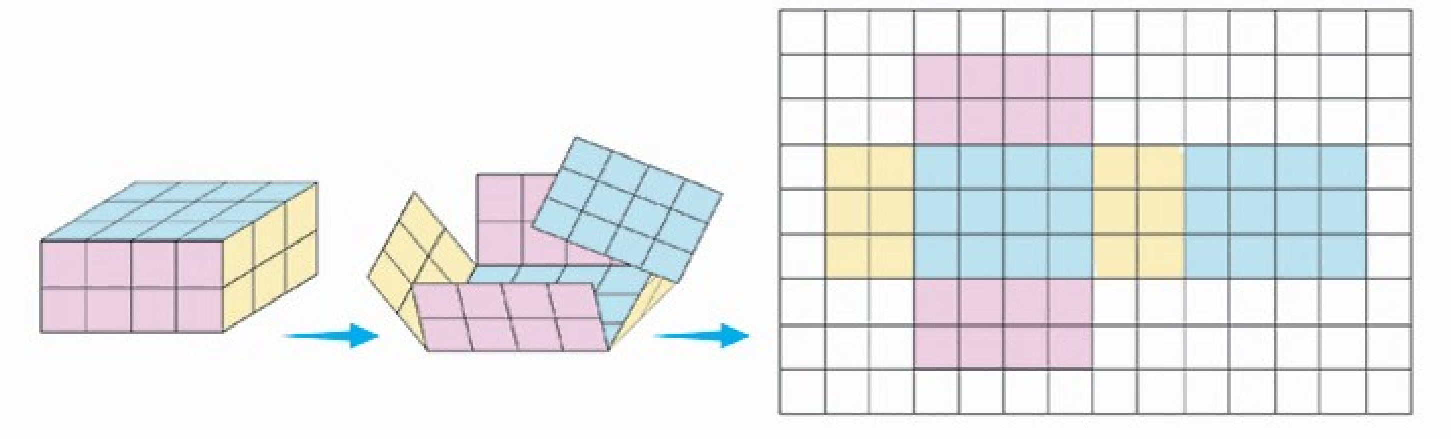
1. Top face and bottom face.
2. Right face and left face.
3. Front face and back face.



1 Cuboid and Nets:

- To find the surface area of a cuboid using a net, calculate the area of each face and then add these faces.

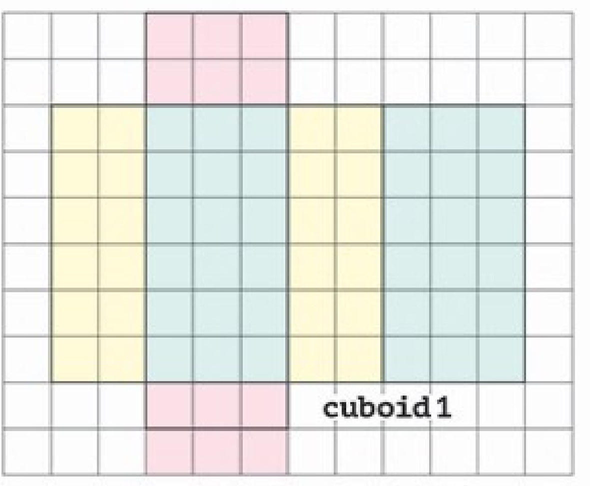
Ex. **Find the surface area of the following cuboid:**

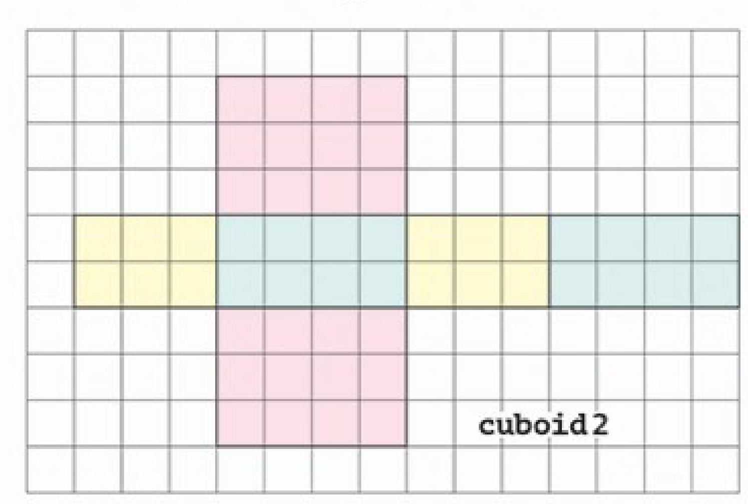


Face of Cuboid	Top	Bottom	Right	Left	Front	Back
Area	12 units²	12 units²	6 units²	6 units²	8 units²	8 units²

Total Surface Area = 12 + 12 + 6 + 6 + 8 + 8 = 52 units²

1 Find the **surface area** of each of the following cuboids:





Face of Cuboid	Top (Units²)	Bottom (Units²)	Right (Units²)	Left (Units²)	Front (Units²)	Back (Units²)	Total (Units²)
Cuboid 1	....	....	....	....	....	....	....
Cuboid 2	....	....	....	....	....	....	....

2 Formula for Surface Area of Cuboid : ec

- To find the surface area of a cuboid using a formula.

Face of Cuboid	Top	Bottom	Right	Left	Front	Back
Area	$l \times w$	$l \times w$	$l \times h$	$l \times h$	$h \times w$	$h \times w$

Total surface area:

SA $= 2 \times (l \times w) + 2 \times (l \times h) + 2 \times (h \times w)$

or SA $= 2 \times (l \times w + l \times h + h \times w)$

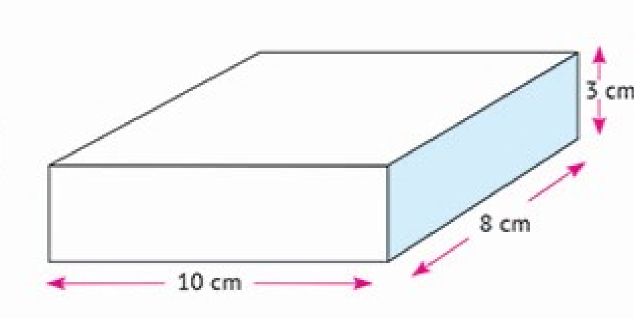
Ex. **Find the surface area of the following cuboid:**

$SA = 2\ [l w + l h + w h]$

$= 2 \times [10 \times 8 + 10 \times 3 + 8 \times 3]$

$= 2 \times [80 + 30 + 24]$

$= 2 \times 134 = 268\ cm^2.$



2 **Find the surface area of the each following cuboid:**

a

3cm
9 cm
3cm

ec

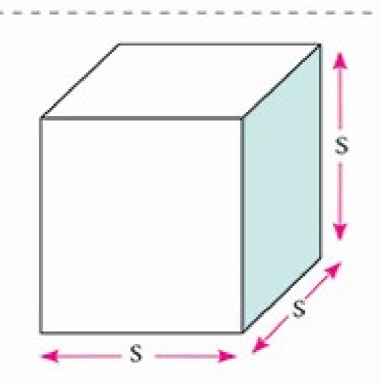
b

3 cm
2 cm
7 cm

A cube

It is a three-dimensional shape with six square faces; all faces are congruent.

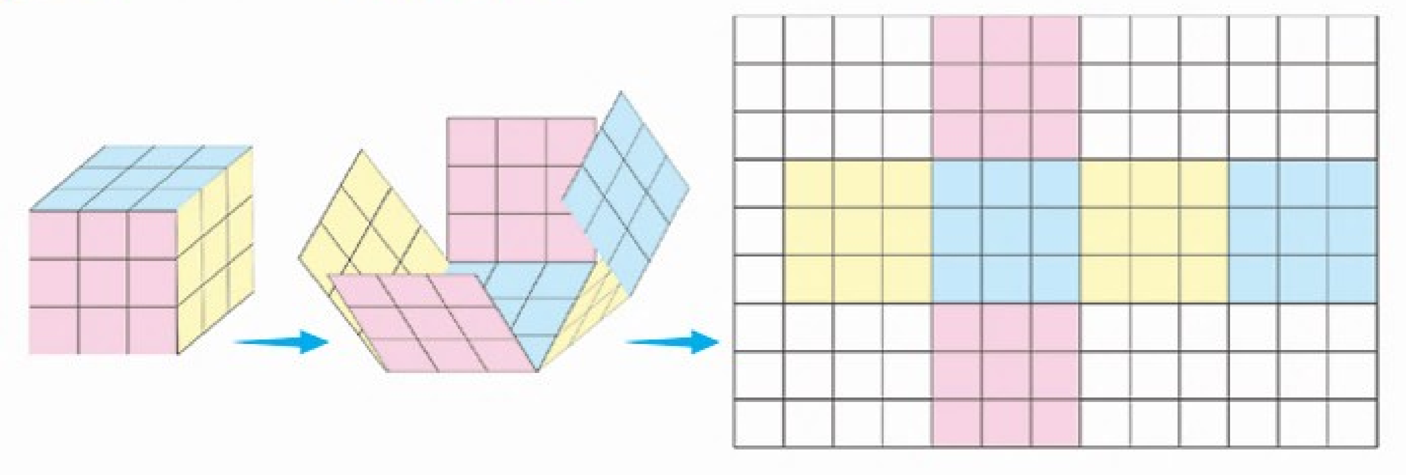
- It is a special case of the cuboid.



1 Cube and Nets:

- To find the surface area of a cube using a net, calculate the surface area of one face and multiply it by 6.

Ex. Find the surface area of the following cube:



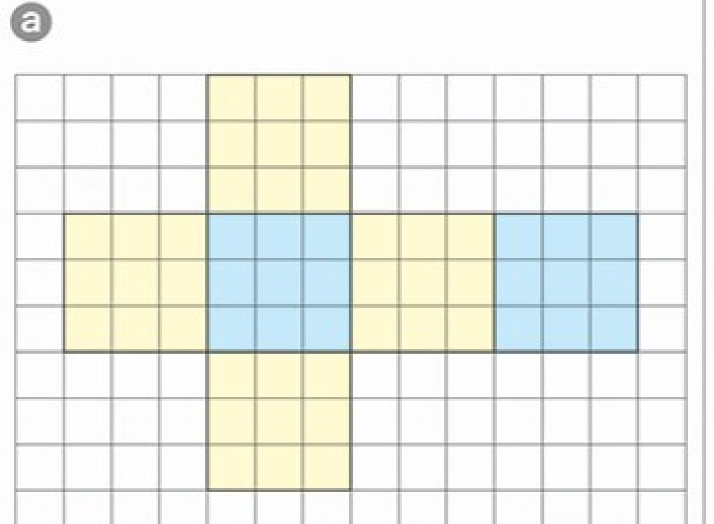
Area of one face = 9 units^2 Total Surface Area = $9 \times 6 = 54$ units^2

ec

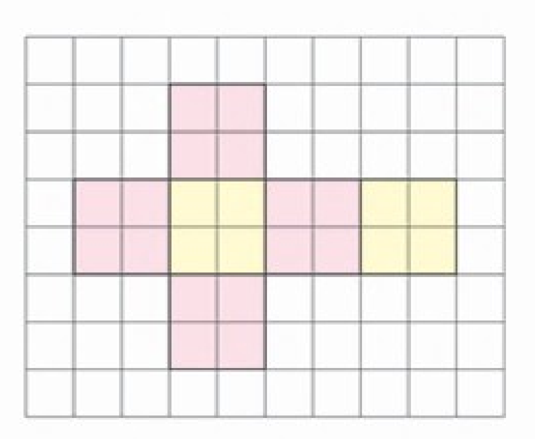


3 Find the surface area of each of the following cube:

ⓐ



ⓑ



Cube 1:

Area of one face = ... units^2.

Surface Area of the cube (SA)

= .... units^2.

Cube 2:

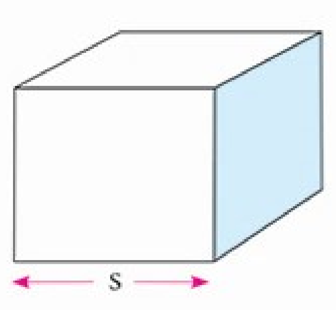
Area of one face = ... units^2.

Surface Area of the cube (SA)

= .... units^2.

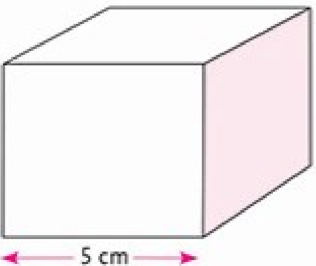
Theme 4

2 Formula for Surface Area of Cube:



- Area of one face = S × S
- Surface Area of the cube (SA) = $6 \times S \times S = 6S^2$.

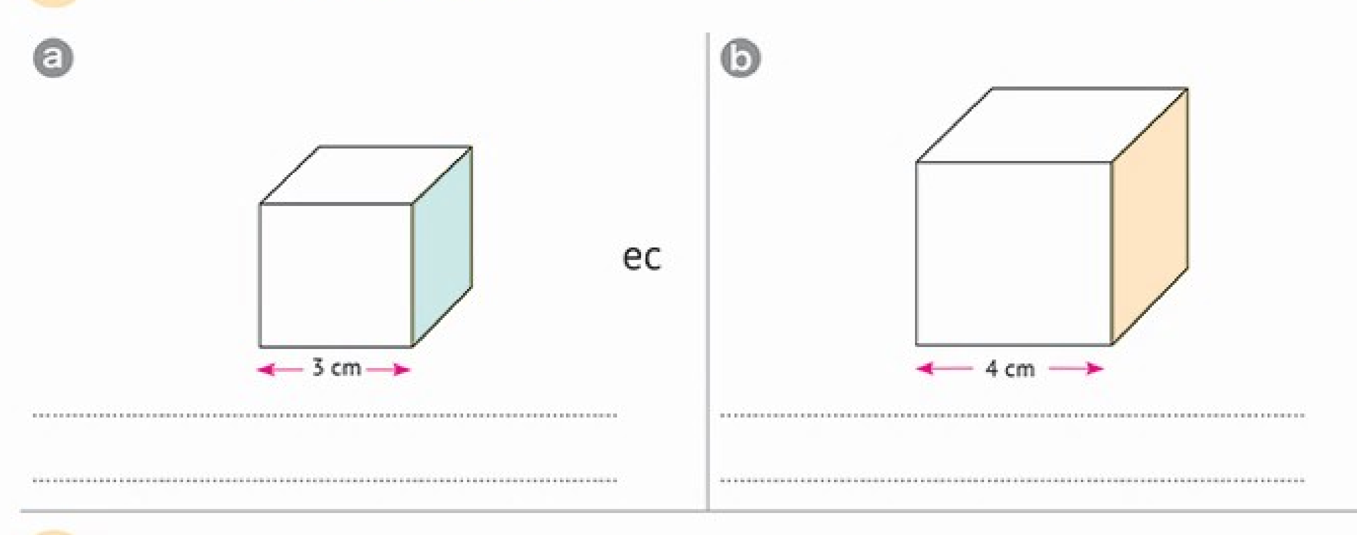
Ex. **Find the surface area of the opposite cuboid:**



SA = $6S^2 = 6 \times 25$

$= 150 \text{ cm}^2$.

4 **Find the surface area of each of the following cubes:**



....

....

5 **A painter paints a door before he installs it. The door is 178 centimeters high, 80 cm long, and 5 cm wide. Find the surface area of the door so that the painter can figure out how much paint to buy.**

....

....

6 **Nada made a cubic box out of sheet metal for an art project. The side length of the box is 8 centimeters. What is the surface area of the sheet metal she used?**

....

....



10

Unit 13

1 Choose the correct answer:

ⓐ The ratio of the area of one face of a cube to its surface area is .... (1 : 8 or 1 : 4 or 1 : 6 or 2 : 3)

ⓑ The surface area of a cuboid with dimensions 2 cm , 5 cm, and 10 cm is .... cm^2.

(2×17 or $2 \times 5 \times 10$ or $2 \times (10 + 50 + 20)$ or $4 + 10 + 20$)

ⓒ The surface area of a cube is 54 cm^2, then the area of one face of this cube is .... cm^2. (3 or 6 or 18 or 9)

ec

2 Complete the following:

ⓐ Surface Area of a cuboid = 2 × (....... × ....) + 2 × (....... × ....) + 2 × (....... × ....)

ⓑ The surface area of a cube with an edge length of 4 cm is ....cm^2.

ⓒ The cube surface area formula is ....

3 Hala has a rectangular piece of cardboard that is 50 cm long and 30 cm wide. Is it enough to make a cube-shaped box with a side length of 15 cm? ....

....

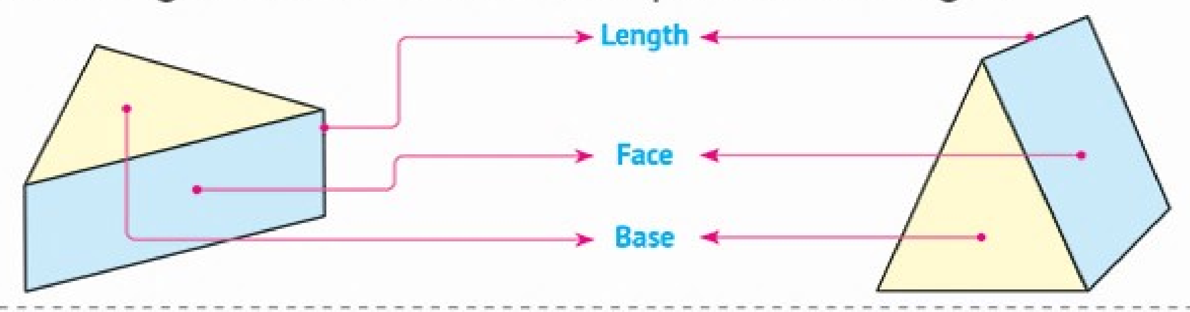
....



Exploring Surface Area of Prism and Pyramid

Triangular Prism

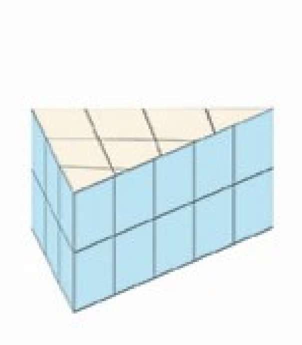
It is a three-dimensional shape with 2 parallel bases in the shape of a triangle and 3 faces in the shape of a rectangle.

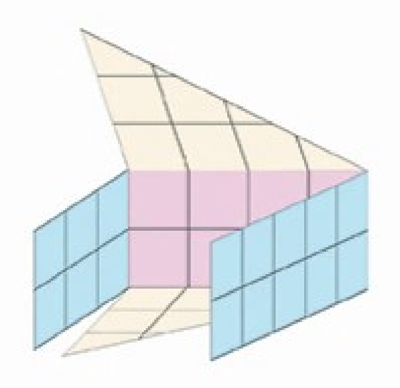


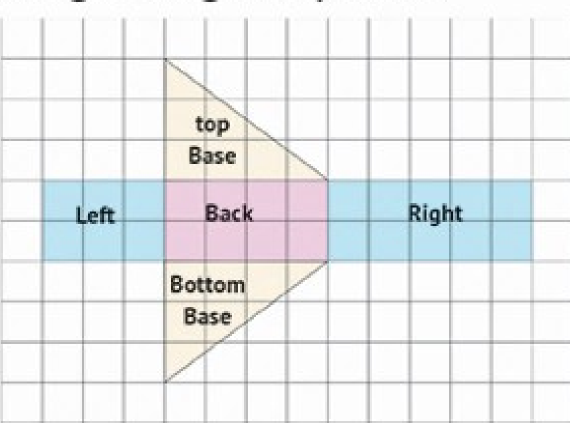
1 Surface Area of Triangular Prism:

- By calculating the area of each face and then adding these faces.

Ex. Find the surface area of the following triangular prism:







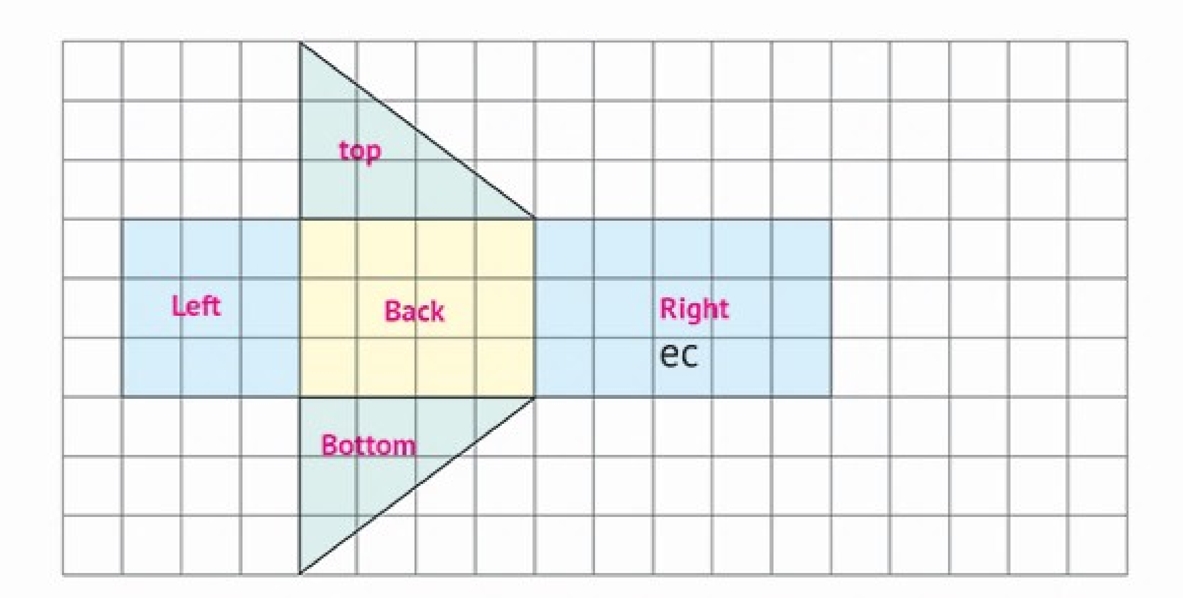
Face of Triangular Prism	Face Shape	Area
Top (base)	Triangle	$\frac{1}{2} \times 3 \times 4 = 6$ units^2
Bottom (base)	Triangle	$\frac{1}{2} \times 3 \times 4 = 6$ units^2
Back	Rectangle	$4 \times 2 = 8$ units^2
Right Side	Rectangle	$5 \times 2 = 10$ units^2
Left Side	Rectangle	$3 \times 2 = 6$ units^2
Surface Area of Triangular prism		$6 + 6 + 10 + 6 + 8 = 36$ units^2



If the base of a triangular prism is in the form of:

- A scalene triangle, then all sides are not congruent.
- An isosceles triangle, then 2 sides only are congruent.
- An equilateral triangle, then all sides are congruent.

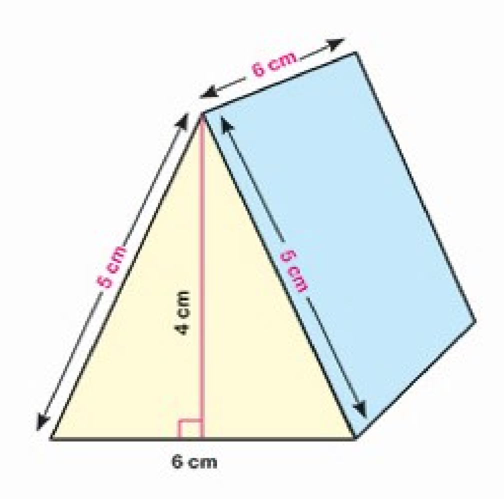
1 **Find the surface area of each of the following triangular prism:**

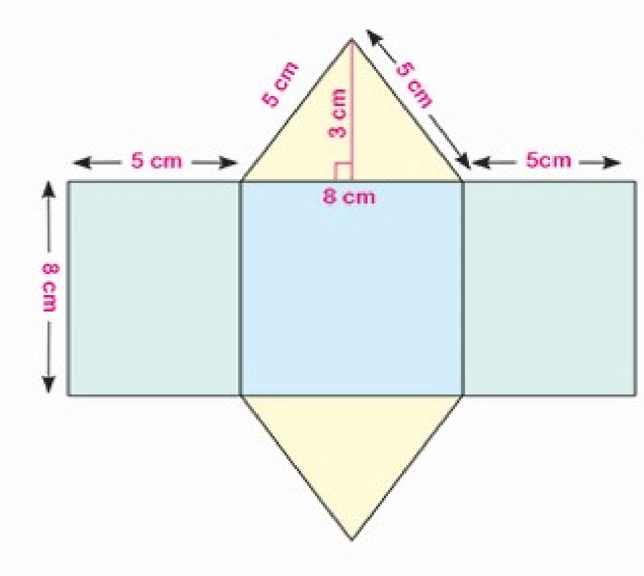


ⓐ

Face of Triangular Prism	Area
Top (base)	....
Bottom (base)	....
Back	....
Right Side	....
Left Side	....
Surface Area	....







ⓑ

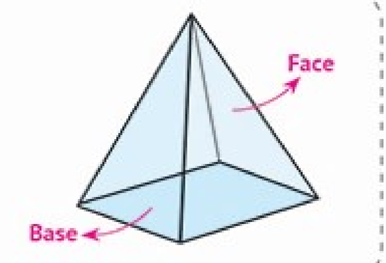
Face of Triangular Prism	Area
Top (base)	
Bottom (base)	ec
Back	
Right Side	
Left Side	
Surface Area	

ⓒ

Face of Triangular Prism	Area
Top (base)	
Bottom (base)	
Back	
Right Side	
Left Side	
Surface Area	

Square Pyramid

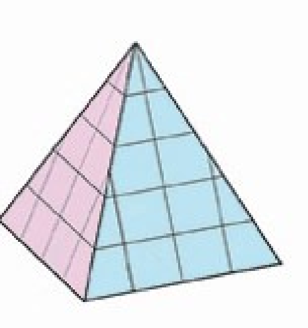
It is a three-dimensional shape with a square base and four congruent faces, each in the form of a triangle.

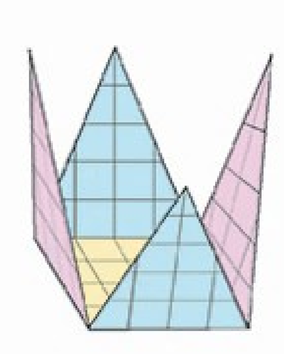


2 Surface Area of Square Pyramid:

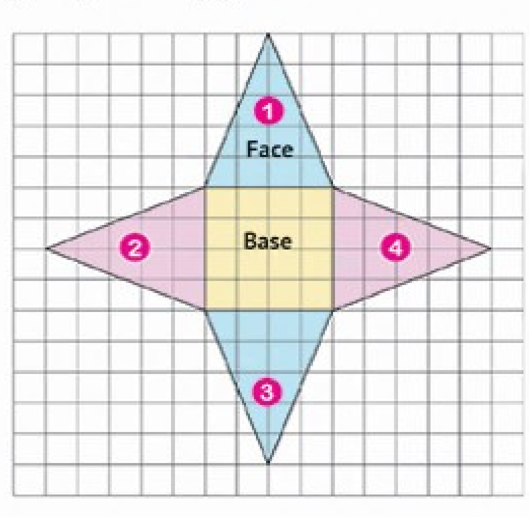
- By calculating the area of each face and then adding these faces.

Ex. **Find the surface area of the following square pyramid:**





ec

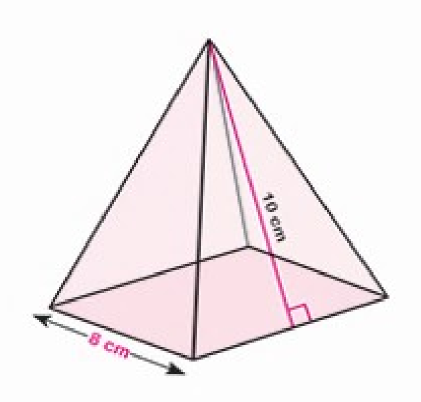


Face of Square Pyramid	Face Shape	Area
Base	Square	$4 \times 4 = 16$ units^2
Face 1	Triangle	$\frac{1}{2} \times 5 \times 4 = 10$ units^2
Face 2	Triangle	$\frac{1}{2} \times 5 \times 4 = 10$ units^2
Face 3	Triangle	$\frac{1}{2} \times 5 \times 4 = 10$ units^2
Face 4	Triangle	$\frac{1}{2} \times 5 \times 4 = 10$ units^2
Surface Area of Square Pyramid		$16 + 10 + 10 + 10 + 10 = 56$ units^2

2 Find the surface area of each of the following square pyramid:

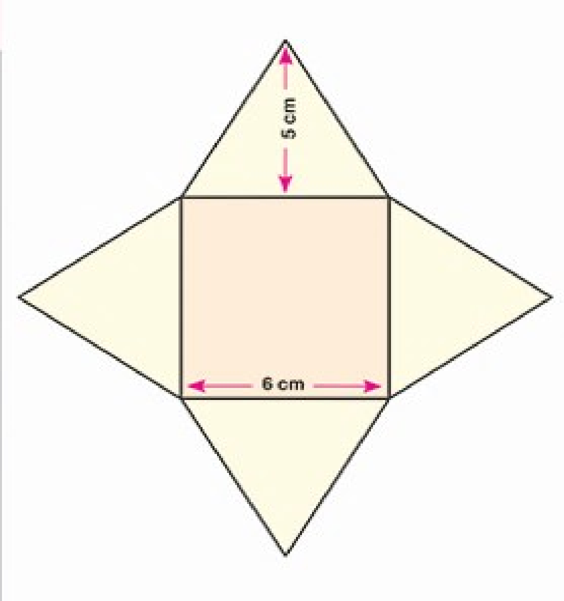
ⓐ

Face of Square Pyramid	Area
Base	....
Face 1	....
Face 2	....
Face 3	....
Face 4	....
Surface Area	....



ⓑ

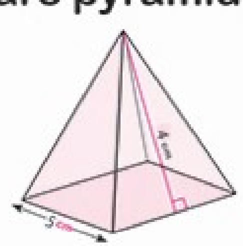
Face of Square Pyramid	Area
Base	....
Face 1	....
Face 2	....
Face 3	....
Face 4	....
Surface Area	....



3 By Using a Formula:

- SA of the square pyramid = Base area + (Area of one face × 4).

Ex. **Find the surface area of the following square pyramid:**



Base area = 5 X 5 = 25 cm2

Face area = ½ X 5 X 4 = 10 cm2

SA of the Square pyramid = 25 + (10 X 4) = 65 cm2

3 **Find the surface area of the following square pyramid:**

12 cm
7 cm

....

....

....

4 **The pyramid of Menkaure is the smallest of the pyramids in Giza. The square base has a side length of about 104 meters. The height of each triangular face is about 84 m. What is the surface area of the pyramid?**

....

....

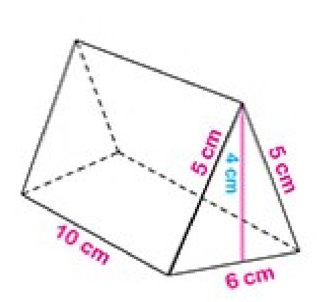
....



10

1 Find the surface area of the following solids:

a

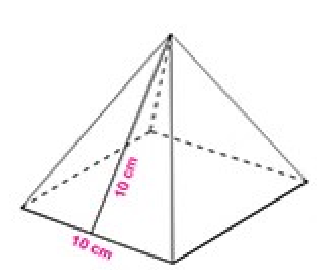


Surface area = ...

....

....

b



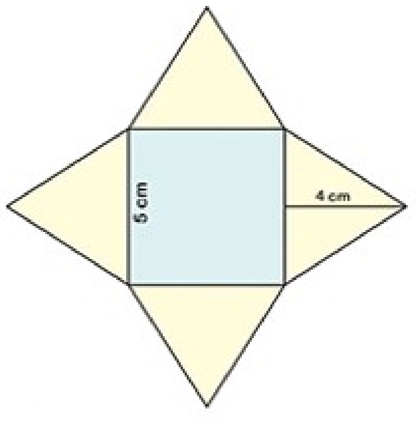
Surface area = ...

....

....

2 Find the surface area of the following solids::

a

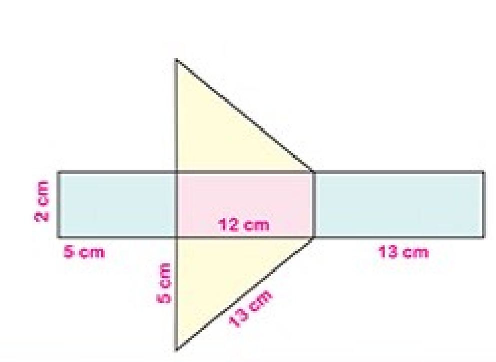


Base area = ...

Area of the face = ...

Total surface area = ...

b



Face of Prism	Area
Bottom (base)	....
Top	....
Back	....
Right Side	....
Left Side	....
Surface Area	....



Surface Area and Volume



Calculate Volume

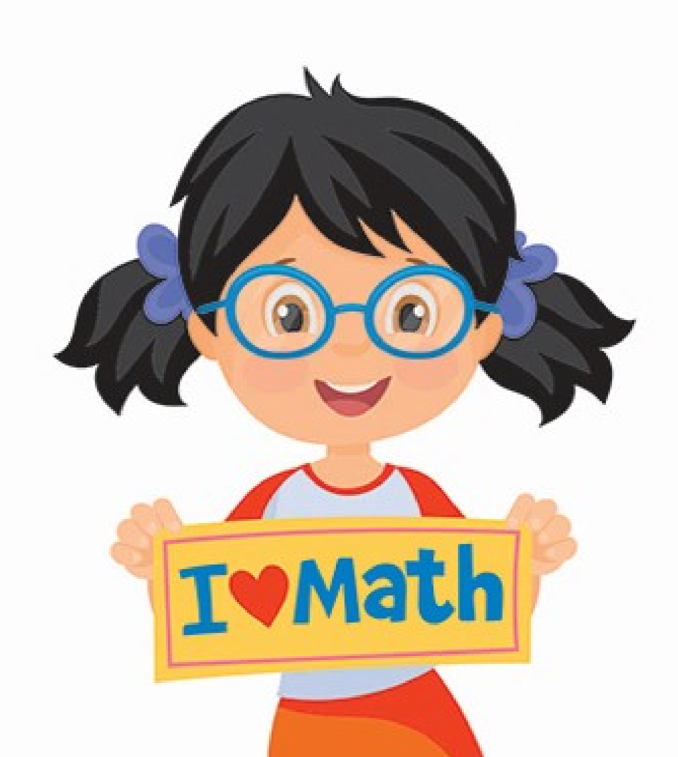
Lessons 3&4

Applications on Volume
Volume of Cuboid with Known Ratios

Learning Objectives:

By the end of these lessons, the student will be able to:

- Use formulas to calculate the volume of cuboids with fractional side lengths.
- Change the dimensions of a cuboid to see how the volume is impacted.





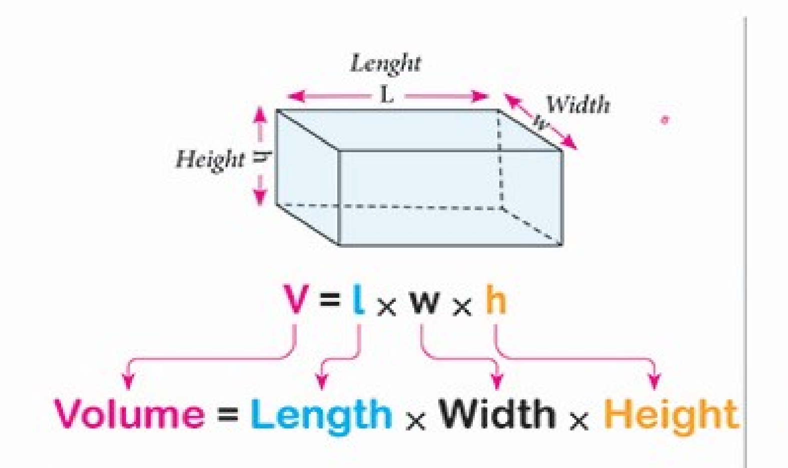
Applications on Volume
Volume of Cuboid with Known Ratios

Remember

- Volume is the amount of space that an object occupies.
- Volume is measured in cubic units, such as cubic meters, cubic centimeters, and cubic millimeters.

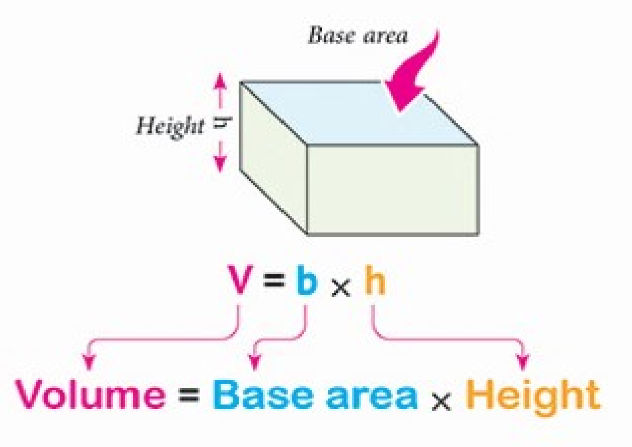
(m^3) , (cm^3), (mm^3)

Volume of Cuboid



$V = l \times w \times h$

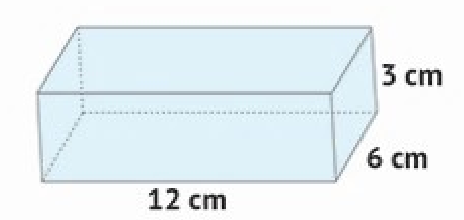
Volume = Length × Width × Height



$V = b \times h$

Volume = Base area × Height

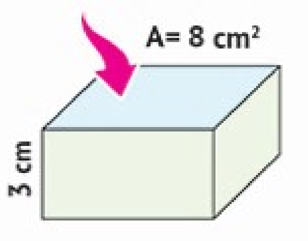
Ex. Find the volume of each of the following:



$V = l \times w \times h$

$= 12 \times 6 \times 3$

$= 216 \text{ cm}^3$



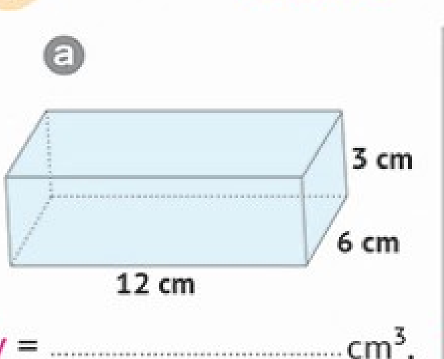
$V = b \times h$

$= 8 \times 3$

$= 24 \text{ cm}^3$

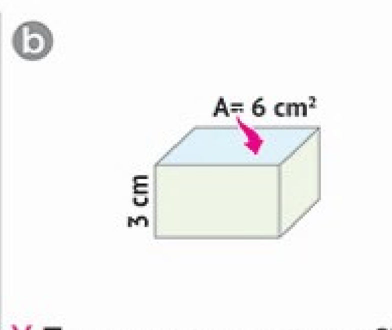
1 **Find the volume of each cuboid of the following:**

ⓐ



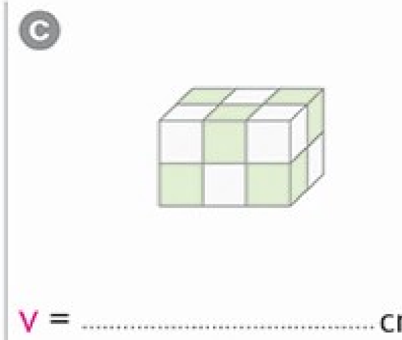
V = ... cm^3.

ⓑ



V = ... cm^3.

ⓒ



V = ... cm^3.

1 Estimating the Volume of a Cuboid:

- To estimate the volume of a cuboid, we can round each dimension down to the nearest whole number and then calculate the estimated volume.

Ex. **The dimensions of a cuboid are 12.5 cm, 4 cm, and 3.75 cm. Estimate its volume, then find the actual volume:**

Answer

Estimate 12.5 cm ⟶ 12 cm , 3.75 cm ⟶ 3 cm

$V = 12 \times 4 \times 3 = 144 \text{ cm}^3$

This means that the size will be bigger than 144 cm^3.

Actual volume $V = 12.5 \times 4 \times 3.75 = 178.5 \text{ cm}^3$

Ex. **The dimensions of a cuboid are**

Length = 8.5 cm, Width = 5 cm, Height = $\frac{3}{4}$ cm,

estimate its volume , then find the actual volume:

Estimate 8.5 cm ⟶ 8 cm

Base area = $8 \times 5 = 40 \text{ cm}^2$.

The height is $\frac{3}{4}$ cm < 1 , so the volume will be less than 40 cm^3.

Actual volume $V = 8.5 \times 5 \times \frac{3}{4} = 31.875 \text{ cm}^3$.

2 **A builder is filling a 3.5 meter by 4.5 m by 2.5 m mold with concrete to make the base for a sculpture.**

Estimate the volume of the mold , then find the actual volume

....

....

....

....

3 **A trunk of a car whose dimensions are 3 m in length, 2.2 m in width, and 0.7 m in height. Estimate its volume and calculate the actual volume.**

....

....

....

....

....

2 Effect of Dimension Doubling on the Volume of a Cuboid:

- Doubling one or more dimensions of a cube affects the total volume.

Ex. **A cuboid, 2 cm long, 3 cm wide, and 4 cm high.**

Complete the following table.

	Length (cm)	Width (cm)	Height (cm)	Volume (cm^3)	**Ratio of the Original Volume to New Volume**
Original Cuboid	2	3	4	**24**	
Double One Dimension (l)	4	3	4	**48**	24 : 48 (÷ 24) 1 : 2
Double Two Dimensions (l&w)	4	6	4	**96**	24 : 96 (÷ 24) 1 : 4
Double Three Dimension	4	6	8	**192**	24 : 192 (÷ 24) 1 : 8

Important Notes:

- The ratio of the new volume to the original volume when.

1. One dimension is doubled: (2 : 1)
2. Two dimensions are doubled: (4 : 1)
3. All dimensions are doubled: (8 : 1)

4 **The dimensions of a cuboid are 10 cm, 5 cm, and 2 cm. What is the new volume if its three dimensions are doubled?**

....

....

....

5 **The volume of cuboid becomes 480 cm^3 after doubling two dimensions of it. What is its original volume?**

....

....

....



10

1 **Complete the following:**

a The dimensions of a cuboid are 5 cm, 2 cm, and 3 cm. Then its volume is ………… cm^3.

b Volume of a cuboid = ……… × ………

c The volume of a cube with side length of 5 cm = ………………… cm^3.

2 **Choose the correct answer:**

a The ratio of the original volume to the new volume when two dimensions are doubled is …………

(1 : 2 or 2 : 1 or 1 : 4 or 4 : 1)

b The estimated volume of a cuboid with dimensions of 2.5 cm , 3.75 cm, and 2.2 cm is ………… cm^3. (12 or 18 or 24 or 36)

c ………… is a unit of the volume measurement.

(cm or cm^2 or cm^3 or dm)

3 Ahmed created a staircase consisting of three steps, the first of which is 20 cm high, 30 cm wide, and 100 cm long. The second step is double the height of the first step, and the third step is double the height of the second step. Find the volume of the third step.

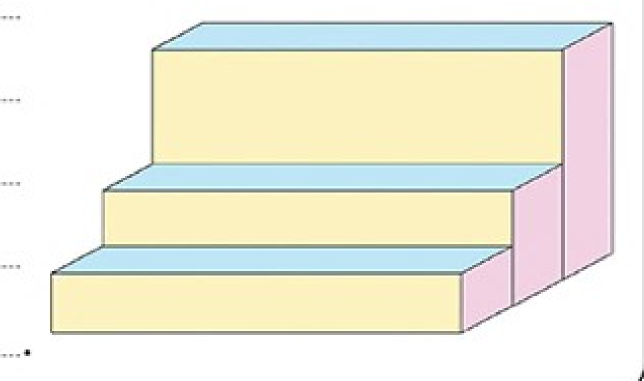
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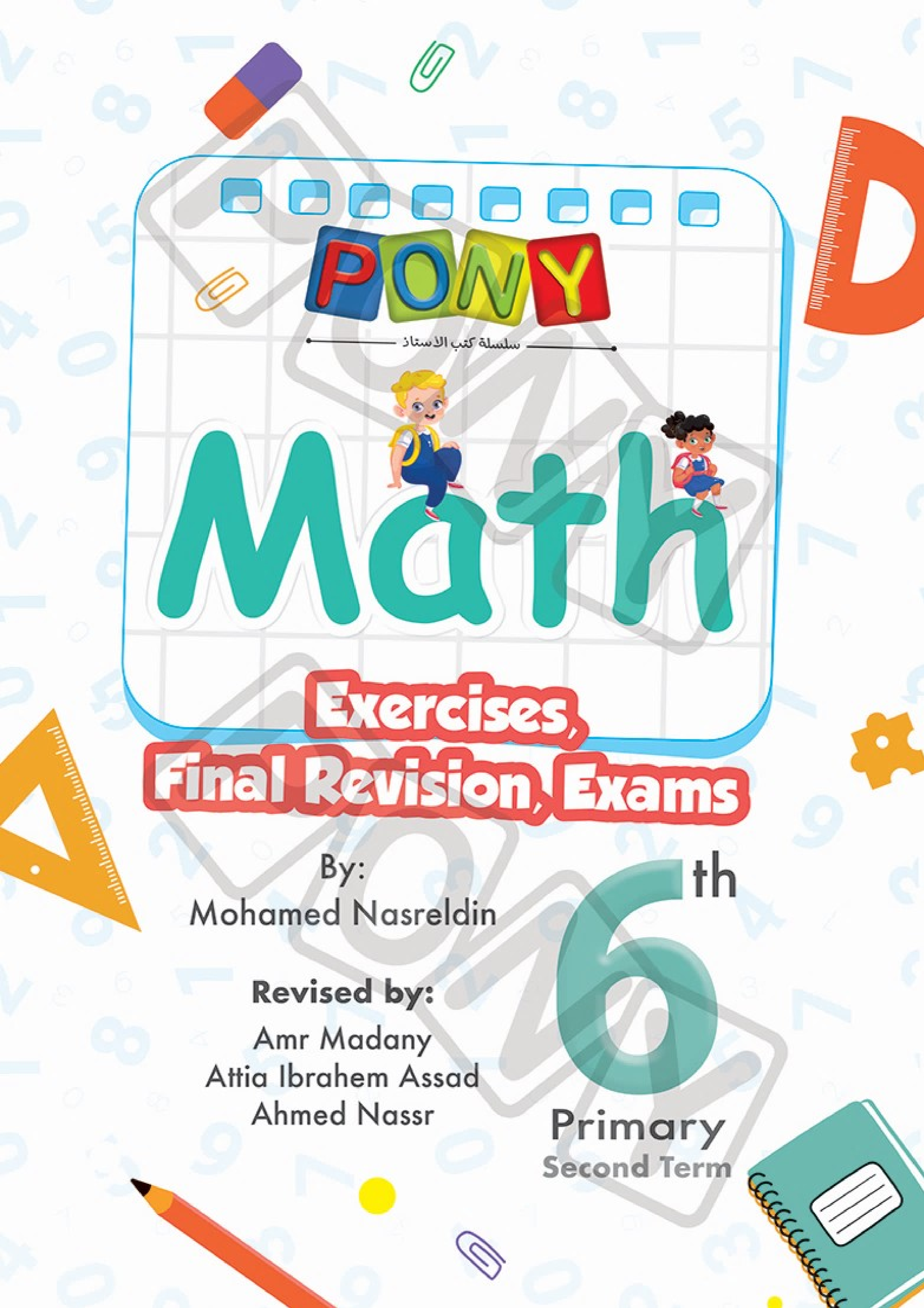
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PONY
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Theme 3

Fractions, Decimals, and Proportional Relationships



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Lessons 1&2

1 Divide using the tape diagram:

a) $\frac{1}{4} \div 2 =$ ....

b) $\frac{2}{5} \div 3 =$ ....

c) $\frac{3}{4} \div 4 =$ ....

d) $\frac{2}{3} \div 3 =$ ....

e) $3 \div \frac{2}{3} =$ ....

f) $4 \div \frac{1}{2} =$ ....

g) $3 \div \frac{1}{3} =$ ....

h) $4 \div \frac{2}{5} =$ ....

i) $2 \div \frac{5}{6} =$ ....



j $\frac{1}{3} \div \frac{5}{6} =$ ....

k $\frac{5}{6} \div \frac{1}{3} =$ ....



l $\frac{1}{2} \div \frac{3}{4} =$ ....

m $\frac{3}{4} \div \frac{1}{2} =$ ....

2 Choose the correct answer:

a The tape diagram representing the division process " $\frac{1}{2} \div 2$ " is ....



b The tape diagram representing the division process " $\frac{1}{3} \div 4$ " is ....



c The tape diagram representing the division process " $5 \div \frac{1}{3}$ " is ....



d The tape diagram representing the division process " $2 \div \frac{2}{3}$ " is ....



e The tape diagram representing the division process "$3 \div \frac{1}{2}$" is ....



f The division operation represented by the following tape diagram is ....

($\frac{2}{3} \div 2$ or $\frac{2}{3} \div 3$ or $\frac{2}{3} \div 4$ or $\frac{2}{3} \div \frac{1}{2}$)

g The division operation represented by the following tape diagram is ....

($3 \div \frac{1}{2}$ or $3 \div \frac{1}{3}$ or $3 \div \frac{1}{4}$ or $2 \div \frac{2}{3}$)

3 Use tape diagram and write a numerical expression to answer the following

a You have $\frac{3}{4}$ meters of pipe, and you want to divide it into 6 pieces of equal length to make models of small robots. What is the length of each piece of pipe that you will use in each robot?

....

b Hana bought $\frac{5}{6}$ kg of strawberries and wants to divide them between her daughter and her son. How much strawberries will each of them get?

....



ⓒ Nader bought 4 pizza pies, and divided them among his friends, each of whom got $\frac{2}{3}$ of the pie. How many friends does Nader have?

....



ⓓ You have 3 liters of paint and need to divide the paint into containers with a capacity of $\frac{3}{5}$ liters. How many containers can you divide the paint into?

....



ⓔ A fisherman has $\frac{2}{3}$ kg of bait, he wants to give each of his friends $\frac{1}{6}$ kg. How many friends does this fisherman have?

....

ⓕ Hana wants to divide a piece of fabric of length $\frac{3}{4}$ meter into smaller pieces each of length $\frac{3}{8}$ meter. How many pieces are there?



....

Assessment on Lessons 1& 2

Unit 8

First: Match each **tape diagram** to its suitable division problem:

ⓐ $\frac{1}{2} \div 3$

ⓑ $3 \div \frac{1}{2}$

ⓒ $\frac{1}{4} \div 4$

ⓓ $4 \div \frac{1}{4}$


1


2


3


4

Second: Find the quotient using the **tape diagram**:

ⓐ $\frac{1}{6} \div 3$

ⓑ $3 \div \frac{2}{3}$

ⓒ $\frac{2}{3} \div \frac{5}{6}$

Third: Safaa wants to divide **4** liters of orange juice into several cups so that each cup contains $\frac{2}{5}$ liters.

How many cups does Safaa need?

....

Lesson 3

1 Choose the correct answer:

a) The reciprocal of 6 is .... (1 or $\frac{1}{6}$ or 16 or 6)

b) The reciprocal of $\frac{2}{7}$ is .... (2 or $\frac{7}{2}$ or 7 or $\frac{2}{7}$)

c) The reciprocal of $\frac{1}{5}$ is .... (1 or 15 or $\frac{1}{5}$ or 5)

d) $\frac{5}{8}$ × .... = 1 (1 or 1 or $\frac{8}{5}$ or $\frac{5}{8}$)

e) $\frac{3}{6}$ ÷ .... = 1 (2 or $\frac{1}{2}$ or 6 or $\frac{6}{3}$)

f) $\frac{2}{3} \div \frac{1}{5}$ = ... ($\frac{2}{3} \times 5$ or $\frac{3}{2} \times 5$ or $\frac{3}{2} \times \frac{1}{5}$ or $\frac{2}{3} \times \frac{1}{5}$)

g) .... ÷ .... = $\frac{4}{7} \times \frac{5}{4}$ ($\frac{7}{4} \div \frac{5}{4}$ or $\frac{7}{4} \div \frac{4}{5}$ or $\frac{4}{7} \div \frac{5}{4}$ or $\frac{4}{7} \div \frac{4}{5}$)

h) Any number multiplied by its reciprocal equals ....

(0 or 1 or the same number or twice the number)

i) $\frac{2}{5}$ ☐ the reciprocal of 5 (< or = or > or ⩽)

j) $\frac{5}{8}$ ÷ .... = $\frac{1}{2}$ ($\frac{8}{5}$ or $1\frac{1}{4}$ or $\frac{5}{16}$ or $\frac{4}{5}$)

2 Complete each of the following:

a) The reciprocal of $\frac{6}{7}$ is ....

b) The reciprocal of $\frac{1}{2}$ is ....

c) The reciprocal of 9 is ....

d) The reciprocal of the number .... is $2\frac{1}{4}$

e) $\frac{3}{5}$ ÷ .... = $\frac{3}{5} \times \frac{4}{3}$

f) .... ÷ $\frac{8}{9}$ = $\frac{2}{3}$ × ....

g) $\frac{5}{9} \div \frac{1}{3}$ = ... × .... = ...

h) $\frac{3}{8}$ × .... = 1

i) $\frac{2}{7}$ ÷ .... = 1

j) 7 ÷ .... = 7 × 2

3 Divide:

a) $\frac{2}{9} \div \frac{2}{3} =$ ....

b) $\frac{5}{6} \div \frac{5}{9} =$ ....

c) $\frac{1}{8} \div \frac{3}{4} =$ ....

d) $\frac{4}{7} \div 8 =$ ....

e) $\frac{3}{4} \div 9 =$ ....

f) $\frac{1}{2} \div 2 =$ ....

g) $8 \div \frac{2}{3} =$ ....

h) $6 \div \frac{3}{5} =$ ....

i) $4 \div \frac{6}{7} =$ ....

j) $2 \div \frac{1}{2} =$ ....

4 Answer the following:

a) You have $\frac{3}{4}$ meters of fabric, and you want to divide it into 6 pieces of equal length. What is the length of each piece of fabric?

....



(b) Hanaa wants to divide a piece of land of $\frac{8}{9}$ square meters into smaller pieces of $\frac{1}{3}$ square meters each. How many pieces are there?

....

(c) Nadia bought $\frac{5}{6}$ kg of apples and wants to divide them among her three children. What is the share of each child?

....

(d) Murad has $\frac{5}{8}$ pieces of chocolate, and he wants to give each of his friends $\frac{5}{24}$ of a piece of chocolate. How many friends does he have?

....

(e) Fouad bought 3 pizza pies, and divided them among his friends, so each of them got $\frac{1}{2}$ of a pie. How many friends does Fouad have?

....

(f) You have 9 liters of juice and you need to divide the juice into bottles, each with a capacity of $\frac{3}{4}$ liters. How many bottles do you need?

....

Assessment on Lesson 3

Unit 8

1 Choose the correct answer:

ⓐ $\frac{7}{9} \div \frac{7}{12} =$ .... ($\frac{1}{3}$ or $\frac{9}{12}$ or $\frac{3}{4}$ or $1\frac{1}{3}$)

ⓑ .... $\times 5 = 1$ ($\frac{1}{5}$ or 0 or 1 or 5)

ⓒ The reciprocal of the number .... is $1\frac{2}{3}$

($2\frac{1}{3}$ or $1\frac{3}{2}$ or $\frac{3}{5}$ or $\frac{5}{3}$)

ⓓ .... $\div \frac{1}{2} = \frac{1}{3}$ ($\frac{1}{6}$ or 6 or $\frac{3}{1}$ or $\frac{2}{3}$)

2 match:

ⓐ $\frac{3}{10} \times \frac{5}{6}$ • • $\frac{3}{5} \div \frac{3}{5}$ [1]

ⓑ $\frac{8}{9} \times \frac{3}{4}$ • • $\frac{1}{2} \div 2$ [2]

ⓒ $\frac{5}{8} \times \frac{8}{5}$ • • $\frac{2}{3} \div 4$ [3]

ⓓ $\frac{4}{9} \times \frac{3}{8}$ • • $\frac{2}{5} \div \frac{3}{5}$ [4]

3

Hossam distributed 6 cake moulds to a group of children, and each of them got $\frac{3}{4}$ cake. How many children did Hossam distribute cake to?

....

Lesson 4

1 **Multiply (35 x 12) using standard algorithm then complete:**

ⓐ 3.5 × 12 = ...
ⓑ 35 × 0.12 = ...
ⓒ 3.5 × 1.2 = ...
ⓓ 0.35 × 1.2 = ...
ⓔ 3.5 × 0.12 = ...
ⓕ 0.35 × 12 = ...
ⓖ 35 × 1.2 = ...
ⓗ 0.35 × 0.12 = ...

3 5
× 1 2
....
+ ....
....

2 **Multiply (105 x 24) using standard algorithm then complete:**

ⓐ 105 × 2.4 = ...
ⓑ 1.05 × 24 = ...
ⓒ 105 × 0.24 = ...
ⓓ 0.105 × 24 = ...
ⓔ 105 × 0.024 = ...
ⓕ 10.5 × 2.4 = ...
ⓖ 10.5 × 24 = ...
ⓗ 1.05 × 0.24 = ...

1 0 5
× 2 4
....
+ ....
....

3 **Use the standard algorithm to find the product:**

ⓐ	ⓑ	ⓒ	ⓓ
3.6	0.368	6.07	115.2
× 0.7	× 5	× 9	× 0.06
....	....	....	....

ⓔ	ⓕ	ⓖ	ⓗ
4.57	3.336	37.07	12.25
× 5.9	× 0.21	× 13	× 3.5
....	....	....	....
+	+	+	+ ....
....	....	....	....

ⓘ	ⓙ	ⓚ	ⓛ
6.35	3021	20.02	3.27
× 1.7	× 0.032	× 3.6	× 24
....	....	....	....
+	+	+	+ ....
....	....	....	....

Theme 3

4 Compare using (<, =, or >):

a	2.8 × 3.4	0.28 × 34	b	6.3 × 12	0.63 × 12
c	6.4 × 0.37	64 × 3.7	d	2.2 × 2.2	0.22 × 22
e	4.5 × 0.2	45 × 20	f	6.34 × 32	63.4 × 3.2
g	2.5 ÷ 0.5	25 ÷ 5	h	0.45 ÷ 9	45 ÷ 0.9
i	30 ÷ 1.5	3 ÷ 15	j	3.6 ÷ 1.2	0.36 ÷ 0.12
k	48 ÷ 0.8	4.8 ÷ 8	l	6.3 ÷ 0.9	63 ÷ 0.9
m	1.44 ÷ 12	14.4 ÷ 0.12	n	225 ÷ 25	0.225 ÷ 0.25

5 Use the standard algorithm to find the quotient:

a) 6 ⟌ 157.2

b) 8 ⟌ 23.64

c) 5 ⟌ 4.735

d) 4 ⟌ 25.48

e) 16 ⟌ 24

f) 25 ⟌ 28.5

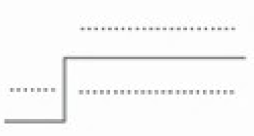
g) 4 ⟌ 25

h) 6 ⟌ 3.15

6 Use the standard algorithm to find the quotient:

a) 45.24 ÷ 0.4 = ...

.... ÷ ....



b) 36.7 ÷ 0.05 = ...

.... ÷ ....



c) 1.242 ÷ 0.006 = ...

.... ÷ ....

d) $1.536 \div 0.6 =$ ....

.... ÷ ....

e) $245 \div 0.7 =$ ....

.... ÷ ....

f) $934 \div 0.8 =$ ....

.... ÷ ....

g) $65.65 \div 0.13 =$ ....

.... ÷ ....

h) $1.44 \div 1.2 =$ ....

.... ÷ ....

i) $45.6 \div 0.15 =$ ....

.... ÷ ....

7 If $53 \times 31 = 1{,}643$, then:

a) $16.43 \div 31 =$ ....

b) $1.643 \div 0.53 =$ ....

c) $1{,}643 \div 3.1 =$ ....

d) $164.3 \div 0.53 =$ ....

e) $164.3 \div 3.1 =$ ....

f) $16.43 \div 5.3 =$ ....

g) $1.643 \div 0.31 =$ ....

h) $1643 \div 5.3 =$ ....

i) $3.1 \times 5.3 =$ ....

j) $31 \times 0.53 =$ ....

k) $31 \times 5.3 =$ ....

l) $0.31 \times 5.3 =$ ....

m) $3.1 \times 53 =$ ....

n) $3.1 \times 0.53 =$ ....

o) $0.31 \times 53 =$ ....

p) $31 \times 53 =$ ....

8 Answer the following:

a. Nada bought 26 meters of fabric. If the price of one meter is 43.5 pounds, how many pounds did Nada pay?

....

b. Khaled bought 9.5 liters of juice at a price of 12.7 pounds per liter. How many pounds did Khaled pay?

....

c. If a piece of one pizza costs 22.25 pounds, how much do 12 pieces of the same type cost?

....

d. Rashida saved 350 pounds to buy a toy car, and she saved 12.5 pounds every day by doing some simple work.

How many days did she need to work to save enough money to buy the toy car?

....

e. Mona bought 9 meters of fabric, she paid 214.2 pounds. What is the price of each meter of fabric?

....

f. If the profits of a store are 728 pounds, and these profits are to be distributed equally among 5 people, what is the share of each person?

....

g. A car consumed 210 liters of gasoline in 4 months. How many liters did the car consume on average in one month?

....

h. Sarah bought 20 kilograms of sugar. If she used 4.5 kilograms to make drinks and distributed the rest equally among 5 bags, how many kilograms of sugar were in each bag?

....

....

Assessment on Lesson 4

Unit 8

1 Complete the following:

ⓐ If $25 \times 33 = 825$, then $0.25 \times 3.3 =$ ....

ⓑ $0.02 \times 0.03 =$ ....

ⓒ $4.5 \div 0.09 =$ .... $\div 9$

ⓓ .... $\div\ 2.5 = 1{,}200 \div 25$

ⓔ $0.2 \times 0.3 \times 0.5 =$ ....

2 If $434 \times 12 = 5{,}208$, then:

ⓐ $43.4 \times 1.2 =$ ....

ⓑ $4.34 \times 1.2 =$ ....

ⓒ $43.4 \times 0.12 =$ ....

ⓓ $4.34 \times 0.12 =$ ....

ⓔ $520.8 \div 0.12 =$ ....

ⓕ $520.8 \div 43.4 =$ ....

ⓖ $5.208 \div 0.12 =$ ....

ⓗ $520.8 \div 0.434 =$ ....

3 Answer the following:

ⓐ A pasta manufacturing factory produces 832.5 kilograms of pasta daily, packaged in bags with a capacity of 450 grams per bag. Find the number of bags needed for this.

....

....

ⓑ Huda bought 3 notebooks for 4.75 LE each and 4 pens for 1.25 LE each. Calculate the money Huda paid.

....

....

Assessment 1 on Unit 8



First: **Choose the correct answer:**

1. $\frac{5}{6} \div \frac{1}{3} =$ .... ($\frac{5}{2}$ or $1\frac{1}{4}$ or $\frac{3}{2}$ or $\frac{4}{5}$)
2. The reciprocal of the number .... is $\frac{5}{8}$. ($\frac{3}{8}$ or $\frac{5}{8}$ or $3\frac{1}{5}$ or $1\frac{3}{5}$)
3. $5.2 \times 0.3 =$ .... (0.156 or 1.56 or 15.6 or 156)
4. $45 \div 0.9 =$ .... $\div 9$ (0.45 or 450 or 45 or 4.5)

Second: **Complete:**

1. $\frac{3}{4} \div$ .... $= 4$
2. $8 \div \frac{1}{3} =$ .... $\times$ ....
3. $2.3 \times$ .... $= 230$
4. .... $\div 0.8 = 2.3$

Third: **Answer the following:**

a. Divide using the forms shown:

1. $3 \div \frac{4}{5} =$ ....
2. $\frac{2}{3} \div \frac{1}{2} =$ ....

b. Hiyam bought 17 boxes of juice; the price of each one is 2.25 pounds.

How many pounds did she pay the seller?

....

....

Assessment 2 on



Unit 8

First: **Choose the correct answer:**

1. $\frac{2}{5} \div \frac{4}{15} =$ .... ($\frac{4}{5}$ or $\frac{2}{15}$ or $\frac{2}{3}$ or $1\frac{1}{2}$)
2. The reciprocal of 5 is .... ($\frac{1}{5}$ or $\frac{3}{5}$ or $\frac{5}{5}$ or 5)
3. 1.5 × .... = 150 (0.1 or 1,000 or 100 or 10)
4. .... ÷ 0.3 = 12 ÷ 3 (0.12 or 1.2 or 12 or 120)

Second: **Complete:**

1. .... $\div 4 = \frac{3}{8}$
2. $\frac{4}{15} \div \frac{2}{3} =$ .... × ....
3. .... × 0.8 = 3.2
4. 4.5 ÷ .... = 0.9

Third: **Answer the following:**

a) Divide using the forms shown:

1. $\frac{2}{5} \div 3 =$ ....
2. $\frac{4}{9} \div \frac{2}{3} =$ ....

b) A rectangle with an area of 10.25 square meters and a length of 4.1 m.

Calculate the width and perimeter of the rectangle.

....

....

Unit 9 Ratio and Its Applications

Concept 9.1 Understand Ratio

Lesson 1

1 Determine whether the following comparisons are ratios or not:

	Comparisons	Are Ratios	Are not Ratios
a	The number of strawberries to the number of bananas in the basket.		
b	The number of pupils who like playing football is greater than the number of pupils who like go swimming.		
c	The number of students who support Al-Zamalek club is fewer than the number of students who support Al-Ahly club.		
d	The number of girls to the number of boys in the same class.		

2 By using the opposite figure,

Find in the simplest form the ratio between:

a) The number of red apples to the number of green apples: .... : ....

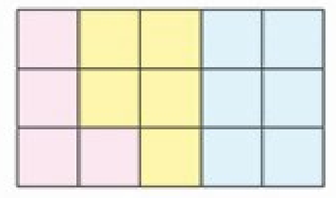
b) The number of green apples to the number of red apples: .... : ....

c) The number of green apples to the number of all apples: .... : ....

d) The number of red apples to the number of all apples: .... : ....

e) The number of red apples = $\frac{\dots\dots}{\dots\dots}$ the number of green apples.

f) The number of green apples = $\frac{\dots\dots}{\dots\dots}$ the number of all apples.



3 **By using the opposite figure,**

Complete the following:

ⓐ The number of red squares = $\frac{\cdots\cdots}{\cdots\cdots}$ the number of all squares.

ⓑ The number of yellow squares = $\frac{\cdots\cdots}{\cdots\cdots}$ the number of all squares.

ⓒ The number of blue squares = $\frac{\cdots\cdots}{\cdots\cdots}$ the number of all squares.

4 **By using the opposite figure,**

Find in the simplest form the ratio between:



ⓐ The number of squares to the number of circles



is .... : ....

ⓑ The number of squares to the number of triangles

is .... : ....

ⓒ The number of circles to the number of triangles is .... : ....

ⓓ The number of squares to the number of all shapes is .... : ....

ⓔ The number of triangles to the number of all shapes is .... : ....

5 **Write each of the following ratios in the simplest form:**

ⓐ 15:25 = ...

ⓑ 84:36 = ...

ⓒ $\frac{14}{49}$ = ...

ⓓ 18:27 = ...

ⓔ 1,200:3,200 = ...

ⓕ $\frac{14}{42}$ = ...

ⓖ 72:90 = ...

ⓗ 500:400 = ...

ⓘ $\frac{64}{16}$ = ...

ⓙ $\frac{4}{11}$ = ...

6 Complete the following:

a) The ratio between 3,200 to 4,800 is .... : ....

b) The ratio between the side of an equilateral triangle to its perimeter is .... : ....

c) Farida spends 120 LE in 4 days, then the rate of what she spends = ... LE/day.

d) Ahmed drinks 14 cups of juice in the week. Then he drinks .... cups in a day.

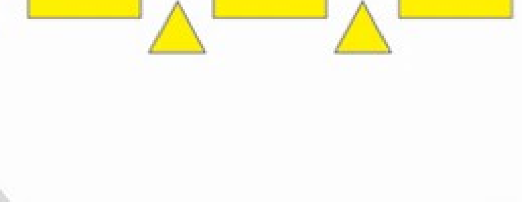
e) In the ratio 9:5, the first term is .... and the second term is ....

f) If a car covers 108 km in 3 hours, then its average speed = ... km/hour.

g) The ratio between two sides in the same square is .... : ....

h) The ratio between 450 : 150 in the simplest form is .... : ....

i) In the opposite figure, the ratio between the number of triangles to the number of rectangles is .... : ....



j) A square of side length is 5 cm and rhombus of side length is 10 cm, then the ratio between perimeter of square to the perimeter of rhombus is .... : ....

7 Marwan has 600 LE. He spends 450 LE. Complete:

a) The money that he spends: the total money = ... : ....

b) The money that he saves: the total money .... : ....

c) The money that he saves: the money that he spends = ... : ....

8 **A school announced a trip to visit the Grand Egyptian Museum, so 15 boys and 25 girls applied for the trip, and the school assigned the supervision of the trip to 5 teachers:**

a. The ratio between the number of boys to the girls is .... : ....

b. The ratio between the number of boys to all students is .... : ....

c. The ratio between the number of teachers to the girls is .... : ....

d. The ratio between the number of teachers to all students is .... : ....

9 **Choose the correct answer:**

a. A a water tap is leaking 420 litres of water in one hour, then the rate of leaking = ... L/min. (420 or 7 or 70 or 42)

b. Ahmed has 64 LE and Yasmin has 24 LE, then the ratio of what Yasmin has to Ahmed is .... (8 : 3 or 3 : 8 or 6 : 8 or 8 : 32)

c. 35 : 20 = ... : .... (7 : 4 or 4 : 7 or 5 : 7 or 4 : 5)

d. An amount of food is distributed between two people in the ratio 3 : 4 then what the first person took = ... the total.

($\frac{3}{4}$ or $\frac{3}{7}$ or $\frac{4}{7}$ or $\frac{4}{3}$)

e. The ratio between the perimeter of a square to its side length is ....

(4 : 1 or 1 : 3 or 3 : 1 or 1 : 4)

f. A factory produces 5,400 cans of soda in 6 hours, the rate of production is .... cans/hour. (9 or 90 or 900 or 9000)

g. Sandy spends 60 LE in 4 days, so the rate of what she spends per day is .... LE/day. (150 or 24 or 15 or 240)

h. $\frac{1}{3}$ = ... ($\frac{6}{12}$ or $\frac{4}{20}$ or $\frac{5}{15}$ or $\frac{5}{20}$)

i. Which ratio of the following does not equal fourth?

($\frac{4}{16}$ or $\frac{5}{20}$ or $\frac{7}{28}$ or $\frac{10}{30}$)

j. Which ratio of the following in the simplest form?

($\frac{3}{12}$ or $\frac{7}{21}$ or $\frac{9}{17}$ or $\frac{5}{30}$)

Assessment on Lesson 1

Unit 9

1 Choose the correct answer:

ⓐ If Mohamed spends 120 pounds within 4 days, then Mohamed spends ………… pounds/day. (15 or 18 or 5 or 30)

ⓑ The ratio between the perimeter of a square to its side length = ………… (1 : 4 or 4 : 1 or 1 : 16 or 16 : 1)

ⓒ The ratio 6 : 18 in the simplest form equals ………… ($\frac{1}{2}$ or $\frac{1}{3}$ or $\frac{1}{4}$ or $\frac{2}{3}$)

ⓓ If a worker paints a wall of area 28 m^2 in 4 hours, then the rate of painting is ………… m^2/hr. (7 or 8 or 9 or 10)

ⓔ 75 : 125 = ………… : ………… (5 : 3 or 5 : 4 or 2 : 3 or 3 : 5)

2 Complete the following:

ⓐ ………… it is a comparison between two quantities that have different units.

ⓑ The ratio between the perimeter of rhombus and its side length is ………… : …………

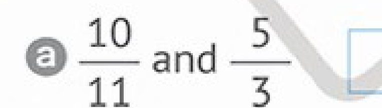
ⓒ A ship covered 180 km in 3 hours, then the speed of the ship is ………… km/hr.

ⓓ The ratio 4,800 : 5,400 in the simplest form is ………… : …………

ⓔ In the opposite figure: the ratio between the number of stars to the circles is ………… : …………

3 Ahmed walks 21 km in the week. Calculate the distance that Ahmed walk per day.

…………………………………………………………………………



Lessons 2&3

1 Determine whether the ratios are equivalent or not:

a) $\frac{10}{11}$ and $\frac{5}{3}$ ☐

b) $\frac{7}{8}$ and $\frac{42}{48}$ ☐

c) $\frac{5}{12}$ and $\frac{25}{60}$ ☐

d) $\frac{10}{9}$ and $\frac{20}{18}$ ☐

e) $\frac{7}{6}$ and $\frac{4}{3}$ ☐

f) $\frac{6}{8}$ and $\frac{9}{13}$ ☐

2 Write two equivalent ratios:

a) $\frac{5}{9} = \frac{\dots}{\dots} = \frac{\dots}{\dots}$

b) $\frac{2}{5} = \frac{\dots}{\dots} = \frac{\dots}{\dots}$

c) $\frac{8}{11} = \frac{\dots}{\dots} = \frac{\dots}{\dots}$

d) $\frac{3}{7} = \frac{\dots}{\dots} = \frac{\dots}{\dots}$

e) $\frac{3}{8} = \frac{\dots}{\dots} = \frac{\dots}{\dots}$

f) $\frac{1}{2} = \frac{\dots}{\dots} = \frac{\dots}{\dots}$

3 Complete the following:

a) The ratio between two numbers is 3:4. The first number becomes 18, then the second number is ....

b) 5 : 7 = ... : 35

c) The ratio between two numbers is 4:7. The second number becomes 35, then the first number is ....

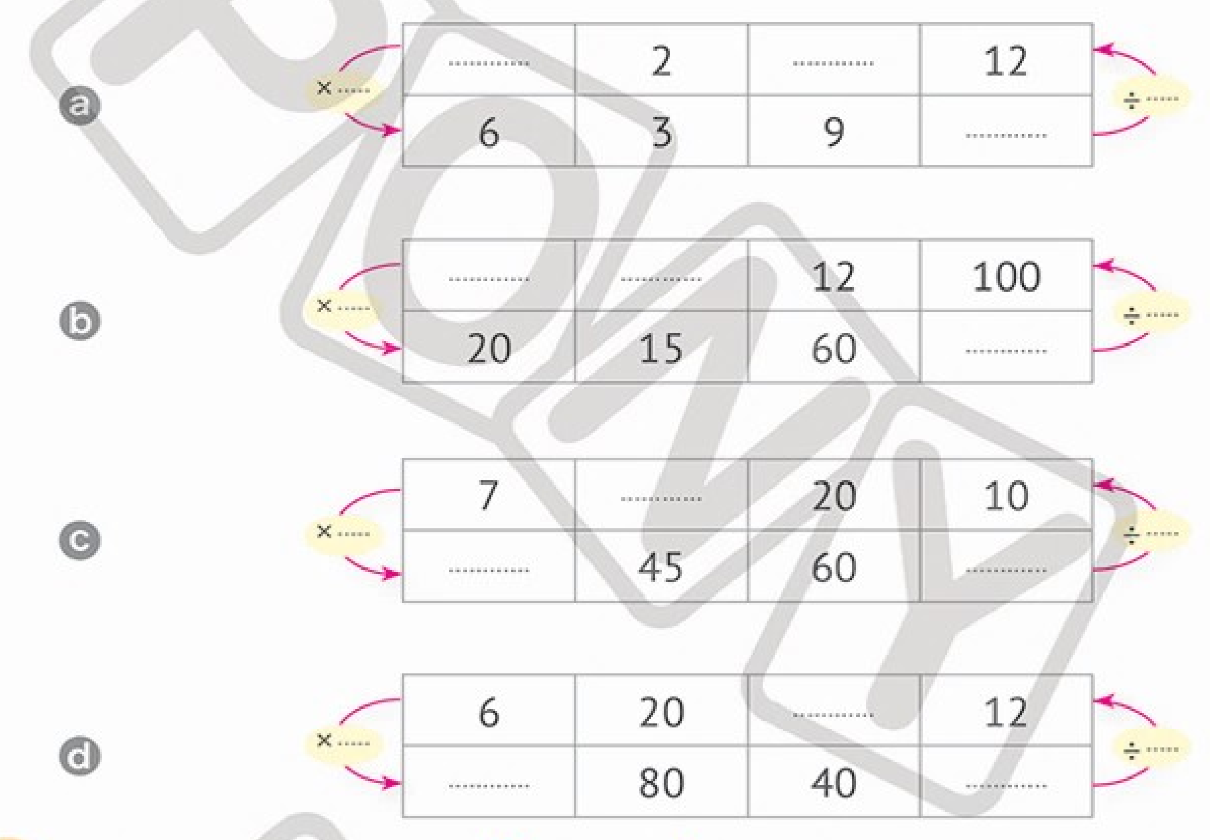
d) Write Two ratios that equal to third .... and ....

e) $\frac{3}{5} = \frac{\dots}{15} = \frac{12}{\dots}$

f) $\frac{1}{7} = \frac{\dots}{21}$

g) If the ratio $\frac{2}{5}$ is equivalent to $\frac{4}{x}$, then x equals ....

4 Complete the following ratio tables:



a) × ...... ÷ ......

......	2	......	12
6	3	9	......

b) × ...... ÷ ......

......	......	12	100
20	15	60	......

c) × ...... ÷ ......

7	......	20	10
......	45	60	......

d) × ...... ÷ ......

6	20	......	12
......	80	40	......

5 A car cyclist covers 24 km in 3 hours.

Complete the following table:

× ...... ÷ ......

Distance(km)	......	16	......
Time (Hours)	5	......	8

6 A tractor plowing the land, it plows 24 kirat in 2 hours.

Complete the table:

× ...... ÷ ......

Distance(kirat)	......	36	......
Time (Hours)	5	......	10

7 A swimmer swims two kilometers in 30 minutes.

Complete the table:

× ...... ÷ ......

Time(minutes)	......	540	......
Distance (km)	5	......	3

8 **An orange export company puts every 10 oranges in one box.**

Answer the following:

a The number of oranges in 10 boxes = ...

b The number of boxes which is enough to contain 90 oranges

= ....

9 **Match the equivalent ratios:**

a $\frac{2}{5}$	$\frac{16}{28}$ 1
b $\frac{4}{7}$	$\frac{16}{40}$ 2
c $\frac{6}{8}$	$\frac{2}{3}$ 3
d $\frac{3}{9}$	$\frac{3}{4}$ 4
e $\frac{16}{24}$	$\frac{2}{6}$ 5

Assessment on Lessons 2&3

Unit 9

1 Choose the correct answer:

a) $\frac{5}{7}$ is equivalent to .... ($\frac{7}{5}$ or $\frac{15}{14}$ or $\frac{25}{35}$ or $\frac{35}{25}$)

b) $\frac{14}{15}$ and $\frac{3}{4}$ are .... (equivalent ratios or not equivalent ratios)

c) 125 : 75 = ... : .... (5 : 3 or 5 : 4 or 2 : 3 or 3 : 5)

d) The ratio between two number is 2:5. If the first number becomes 8, then the second number will be .... (8 or 10 or 15 or 20)

e) A carpenter needs 30 m^3 to make 10 tables, then the rate of used wood = ... m^3/table. (2 or 3 or 4 or 300)

2 Put each of the following ratios in their simplest forms, then match the equivalent ratios:

a) $\frac{8}{16}$ b) $\frac{2}{18}$ c) $\frac{10}{25}$ d) $\frac{9}{12}$

1) $\frac{3}{27}$ 2) $\frac{15}{20}$ 3) $\frac{13}{26}$ 4) $\frac{12}{30}$

3 A supermarket selling 10 kg of sugar every 2 hours.

Complete the following table:

Mass of Sugar in kg	....	500	....	1,000
Time in Hours	5	....	3	....

× ...... ÷ ......

Concept 9.2 Create Equivalent Ratios

Lessons 4&5

1 **Kids car is enough to carry 3 children.**

ⓐ Draw a tape diagram and write numbers on it to represent the ratio of the number of kids cars to the number of children:

ⓑ How many cars are enough to carry 24 children?

....

ⓒ How many kids are there in 13 cars?

....

2 **If 1 kg of meat is enough to feed 6 people:**

ⓐ Draw a tape diagram and write numbers on it to represent the ratio of the number of kilograms of meat to the number of people.

....

ⓑ How many people were fed 9 kilograms of meat?

....

ⓒ If there are 84 people, how many kilograms of meat is needed to feed them? ....

3 Murad uploads videos on YouTube, if a video takes 13 minutes:

ⓐ How many videos will be uploaded in 169 minutes?

ⓑ How long will Murad take to upload 4 videos?

4 **Draw a tape diagram and write numbers on it to represent the ratio 2:6, then complete the following table.**

....	....	24	2	....
12	81	....	6	9

5 **Draw a tape diagram and write numbers on it to represent the ratio 2:7, then complete the following table.**

....	....	120	2	....
21	84	....	7	49

6 **There are 4 apples on each plate.**

ⓐ Draw a double number line diagram and write the numbers to compare the number of plates to the number of apples.

ⓑ How many apples are there in 16 plates? ....

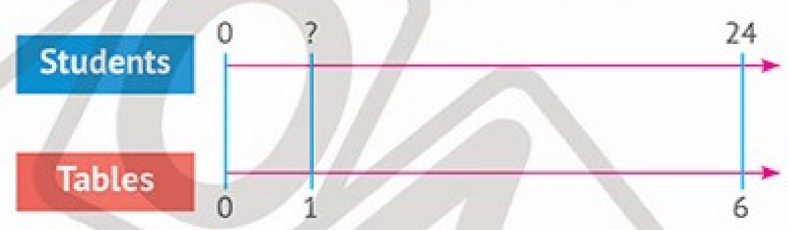
ⓒ How many plates that needed to hold 240 apples? ....

7 **There are wires of metal; each meter of wire weighs 6.7 grams.**

ⓐ Draw a double number line diagram and write the numbers to compare the number of meters of wire to the weight.

ⓑ How much will 7 meters of the same wire weigh? ....

8 **From the following double number line, find:**



• How many children should be seated at each table if there must be the same number of children at each table? ....

9 **From the opposite double number line:**



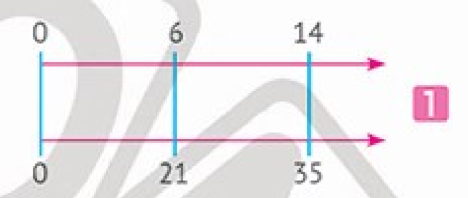
• How many tables do we need to seat all students? ....

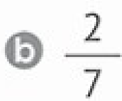
Assessment on Lessons 4&5

Unit 9

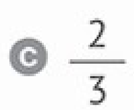
1 **Match each ratio with the appropriate chart:**

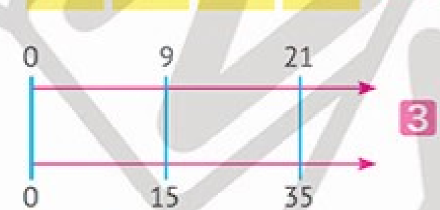

ⓐ 3 : 5

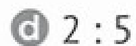



ⓑ $\frac{2}{7}$

2


ⓒ $\frac{2}{3}$




ⓓ 2 : 5




2 **Draw a double number line diagram and write the numbers to represent the ratio 2 : 7, then complete the following table:**

2	8	16	....
7	....	....	91

3 **Jana wants to plant her garden, she takes 4 minutes to plant a tree.**

ⓐ Draw a tape diagram and write numbers on it to represent the ratio of the number of trees to the time it takes her to plant.

ⓑ How long does it take her to plant 6 trees?

....

ⓒ How many trees she will plant in 120 minutes?

....

Lesson 6

1 Put each of the following ratios into its simplest form, then explain whether they are equivalent or not:

a) $\frac{5}{15}$, $\frac{8}{24}$

....
....
....

b) 12 : 18 , 4 : 12

....
....
....

c) $\frac{20}{45}$, $\frac{8}{18}$

....
....
....

d) 3 : 6 , 5 : 10

....
....
....

e) $\frac{35}{63}$, $\frac{125}{275}$

....
....
....

f) $\frac{15}{30}$, 12 : 24

....
....
....

2 Using cross multiplication, explain whether they are equivalent or not:

a) 20 : 8 , 5 : 2

....
....
....

b) 2 : 9 , 12 : 54

....
....
....

c) $\frac{2}{5}$, $\frac{8}{24}$

....
....
....

d) 5 : 1 , 35 : 7

....
....
....

e) 21 : 12 , 12 : 21

....
....
....

f) $\frac{4}{10}$, $\frac{6}{15}$

....
....
....

3 Find the value of x in each of the following equivalent ratios:

a) $\frac{5}{8} = \frac{15}{x}$

$x =$ ....

b) $\frac{2}{7} = \frac{x}{35}$

$x =$ ....

c) $\frac{3}{x} = \frac{27}{18}$

x = ...

d) $\frac{x}{5} = 3$

x = ...

e) $35 : 42 = x : 6$

x = ...

f) $\frac{7}{x} = \frac{35}{45}$

x = ...

g) $\frac{24}{x} = 0.8$

x = ...

h) $5 : 8 = 17.5 : x$

x = ...

i) $28 : 49 = x : 35$

x = ...

j) $\frac{18}{x} = \frac{27}{48}$

x = ...

4 Complete the following table to form equivalent ratios:

2	6	3	x	y
5	L	z	12.5	10

x = ... = ...   y = ... = ...

L = ... = ...   z = ... = ...

5 Complete the following table to form equivalent ratios:

3	a	7	8	d
18	30	b	c	72

a = ... = ...   b = ... = ...

c = ... = ...   d = ... = ...

6 Complete the following:

a) If $\frac{x}{8} = \frac{3}{4}$, then x = ...

b) If 4 : 7 = x : 35, then x − 2 = ...

c) If 2 : x = 16 : 24, then 2x = ...

d) If $\frac{a}{b} = \frac{c}{d}$, then a × d = ...

e) If $\frac{2}{x}$ and $\frac{8}{20}$ are equivalent ratios, then x = ...

f) $\frac{2}{6} = \frac{3}{....} = \frac{....}{12} = \frac{5}{....} = \frac{....}{30}$

g) If $\frac{36}{x} = 0.4$, then x = ...

h) If 8 : x = 10 : 32 , then x = ...

7 Choose the correct answer:

a) 3 : 12 is equivalent to .... (12 : 48 or 6 : 18 or 4 : 12 or 4 : 1)

b) 2 : 9 is equivalent to .... (9 : 2 or 18 : 81 or 18 : 4 or 20 : 45)

c) If $\frac{5}{9} = \frac{15}{x}$, then x = ... (3 or 5 or 15 or 27)

d) If 8 : x = 0.5, then x = ... (4 or 8 or 16 or 40)

e) .... are equivalent ratios.
($\frac{2}{6}$, $\frac{9}{18}$ or $\frac{12}{15}$, $\frac{16}{20}$ or $\frac{6}{7}$, $\frac{12}{21}$ or $\frac{2}{3}$, $\frac{5}{10}$)

f) If x : 15 = 2 : 5, then x + 4 = ... (6 or 8 or 10 or 12)

g) If 3 : x − 1 = 4 : 8 , then x = ... (5 or 7 or 8 or 9)

h) If 4 : x = 12 : 18, then x = ... (6 or 9 or 15 or 18)

i) If 3 : 5 = 12 : 2x, then x = ... (20 or 24 or 12 or 10)

j) If $\frac{4}{5} = \frac{x}{15}$, then x = ... (6 or 21 or 12 or 7)

8 **Laine reads 200 pages in 240 minutes, and Omar reads 25 pages in 30 minutes. Are they reading in equivalent ratios? Explain your answer.**

....

....

....

9 **Seif uses 18 eggs to make 3 cakes, and Gehan uses 24 eggs to make 8 cakes.**

Are they using the same amount of eggs to make their cake? Explain your answer.

....

....

....

10 **A car consumes 20 litres of fuel to cover a distance of 180 km, and a motocycle uses 10 litres of fuel to cover a distance of 140 km.**

Are they using an equivalent ratio of fuel? Explain your answer.

....

....

....

Assessment on Lesson 6

Unit 9

1 Complete:

ⓐ $\frac{3}{7} = \frac{x}{49}$, then $x - 3 =$ ....

ⓑ $\frac{x+3}{14} = \frac{1}{2}$, then x ....

ⓒ $\frac{6}{5}$ is equivalent ratio to ....

ⓓ $\frac{2}{5} = \frac{6}{\dots} = \frac{\dots}{150}$

ⓔ $\frac{x}{5} = 3$,then the value of $x =$ ....

2 Choose the correct answer:

ⓐ If $x : 15 = 2 : 5$, then $x + 3 =$ .... (5 or 7 or 9 or 11)

ⓑ $\frac{3}{18} = \frac{8}{\dots}$ (18 or 48 or 144 or 6)

ⓒ $5 : x = 0.2$ then $x =$ .... (5 or 10 or 25 or 0.5)

3 Which is better to buy:

8 cans of green beans of 36 LE

or 13 cans of green beans of 55.25 LE? Explain your answer.

(where all cans are same kind)

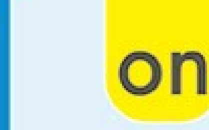
....

....

4 If 100 grams of chocolate give 300 calories, if we had only 40 grams of chocolate, so how many calories would we get?

....

Assessment 1





First: **Choose the correct answer:**

1. Salma reads 140 pages of stories weekly, then she reads .... pages daily. (20 or 7 or 14 or 70)

2. Adam has 36 LE and Lojy has 12 LE, then the ratio of what Lojy has to what Adam has is .... : .... (1 : 8 or 8 : 3 or 1 : 3 or 6 : 12)

3. 45 : 35 = ... : .... (9 : 7 or 4 : 7 or 7 : 5 or 5 : 4)

4. $\frac{5}{15}$ and $\frac{3}{4}$ are .... (equivalent ratio or not equivalent ratio)

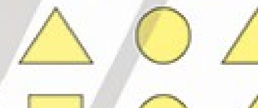
5. The ratio between two numbers is 1 : 7. If the first number becomes 6, then the second number is .... (42 or 14 or 24 or 16)

Second: **Complete:**

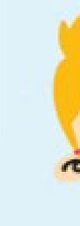
1. The ratio between 3 and 27 in the simplest form is .... : ....
2. The ratio between side length of a square to its perimeter is .... : ....
3. Sara spends 100 LE in 5 days, then she spends .... LE daily.
4. If $\frac{5}{8} = \frac{15}{x}$, then the value of x = ...
5. If 4 : 8 = 2x : 32, then the value of x = ...

Third: **In the following figure:**

1. The ratio of the number of squares to the number of circles in the simplest form is .... : ....
2. The ratio of the number of squares to the number of triangles in the simplest form is .... : ....



Assessment 2 on Unit 9




First: **Choose the correct answer:**

1. 2 : 12 is equivalent to .... (12 : 48 or 6 : 18 or 4 : 12 or 1 : 6)
2. The ratio 72 : 9 in the simplest form is ....
   (9 : 2 or 18 : 81 or 8 or 20 : 45)
3. If $\frac{5}{9} = \frac{15}{x}$, then the value of x = ... (3 or 5 or 15 or 27)
4. If 15 : x – 1 = 4 : 8, then the value of x = ... (15 or 31 or 17 or 16)
5. Ahmed needs to study 21 hours to finish his weekly homework, then the rate of his study per day is ..../hr. (2 or 3 or 4 or 12)

Second: **Complete:**

1. If $\frac{3}{4} = \frac{x}{8}$, then x = ...
2. If 4 : 7 = x : 35, then x – 2 = ...
3. If 7 : x = 42 : 24, then 2x = ...
4. If $\frac{a}{b} = \frac{c}{d}$, then b × c = ...
5. $\frac{2}{x}$ and 8 are two equivalent ratios, then x = ...

Third: **Adham wants to plant trees, He takes 10 minutes to plant a tree, complete the following table:**

3	6	12	....
11	....	....	55

Unit 10 Unit Rate and Percent

Concept 10.1 Understand Unit Rate

Lessons 1-3

1 Complete the following using (Unit rate or Not unit rate):

a The price of one book is 17 pounds. (..............................)

b Ahmed puts 12 oranges in 3 boxes. (..............................)

c Mariam writes 5 papers in one hour. (..............................)

d Lilly works 480 hours in 12 weeks. (..............................)

e A car covers 120 km in one hour. (..............................)

f Noah reads 3 books in one week. (..............................)

g Adam studies 18 pages in 4 hours. (..............................)

h Nahla goes to the club 4 times in a week. (..............................)

i Farida eats 4 chocolate bars in 2 days. (..............................)

j The shopkeeper puts 20 cans in each row. (..............................)

2 Write the following ratios in unit rate:

a 72 pens in 9 packs ⟶ .... pens per pack.

b 120 olives on 8 pizzas ⟶ .... Olives per pizza.

c 10 kg of tomato for 80 LE ⟶ .... kg of tomato per LE

d 6 km in 42 minutes ⟶ .... minute per km.

e 240 students in 8 classes ⟶ .... Student/class.

f 64 biscuits in 4 packs ⟶ .... Biscuits/pack.

g 5 episodes in 200 minutes ⟶ .... minute per episode.

3 Complete the following:

ⓐ Gamal studies 48 hours in 10 days, then he studies .... hour in a day.

ⓑ A printer prints 24 papers in 3 minutes, then it prints .... papers in a minute

ⓒ A cyclist cover 6 km in 2 minutes, then he will cover .... km in 10 minutes.

ⓓ A rabbit jumps 3 leaps in 1 meter, then it will jump .... leaps in 15 meters.

ⓔ If there are 81 litres of water in 18 bottles, then there .... litres in 6 bottles

ⓕ In an exam, Ahmed solved 36 questions in 9 minutes, then he can solve .... questions in 60 minutes

ⓖ A factory produces 1,800 cans of soda every 6 hours, then in 15 hours it will produce .... cans of soda.

ⓗ From the opposite figure, the unit rate of the car's speed is .... km/minute.

28.8 Km			
7.2	7.2	7.2	7.2
1	1	1	1
4 minutes			

4 Choose the correct answer:

ⓐ Malek drinks 21 cups of juice every week, then she drinks .... cups of juice in a day. (5 or 4 or 3 or 6)

ⓑ A car covers 240 km in three hours, then the car's speed is .... km/hr. (70 or 80 or 90 or 110)

ⓒ Mazen studies 21 pages in 6 hours, then the unit rate of his study is .... pages per hour. (5 or 4 or 3.5 or 5.5)

ⓓ Noah spends 24 pounds in 6 days, then she will spend .... LE in 10 days. (240 or 60 or 30 or 40)

ⓔ Last season, Al-Ahly Club scored 95 goals in 38 matches, then Al-Ahly scored .... goals in a match. (3 or 2.5 or 2 or 4)

5 **Lila earns 20 points for every 5 stars she collects in a video game. Complete the ratio table. Then find the unit rate.**

Points	4	....	16	20	28
Star	....	3	....	5	....

....

....

6 **A train travels 480 kilometers in 3 hours. Express this speed as a unit rate. Then complete the following ratio table:**

Distance (km)	480	....	1120	....
Time (hour)	3	5	....	9.5

....

....

7 **Retaj plays 18 hours on her mobile in 9 days. Draw a double number line to represent her rate of playing hours per day, then find her unit rate.**

....

....

8 **A tractor for agricultural land ploughs 6 feddans in 3 hours. Draw a tape diagram and find the rate of work on this plough.**

....

....

9 Omar is making loaves of banana bread. He makes 2 loaves of banana bread, and he uses 5 cups of flour in all. How much flour does he use per loaf?

....

....

10 A machine produces 240 m of cloth every 8 hours. Draw the rate of production using a double line. Then find the unit rate of production per one hour.

....

....

11 A factory (A) produces 600 lamps in 40 hours, and another factory (B) produces 700 lamps of the same kind in 50 hours. Which factory has a better rate of production?

....

....

12 Which is better to buy?

7 rulers for 18.2 pounds or 13 rulers for 32.5 pounds?

(where all rulers are of the same kind)

....

....

Assessment on Lessons 1 – 3

Unit 10

1 **Write the following ratios as unit rates:**

ⓐ Fourteen apples in two barrels

....

ⓑ Thirty-two crayons in two boxes

....

ⓒ Eighteen bottles in three carriers

....

ⓓ Twenty students on four teams

....

ⓔ Twenty-five students on five teams

....

2 **Nasr paid 45 LE for 15 gallons of gasoline. What was the cost per gallon of gasoline?**

....

....

3 **Gehan earns 120 LE for every 6 hours she collects in her job. Complete the ratio table., then find the unit rate:**

LE	20	....	120	520	....
Hours	....	3	6	....	48

4 **Mona bought 5 kg of strawberries; she paid 15 LE. How much money does she pay to buy 7 kg?**

....

....

Unit 10 Unit Rate and Percent

Concept 10.2 Converting Measurements with Ratios

Lessons 4-6

1 **Identify which of the following (Unit rate or Conversion factor):**

ⓐ 1 day : 24 hours (..........................) ⓑ 18 km : 1 hour (..........................)

ⓒ $\frac{1m}{100\ cm}$ (..........................) ⓓ $\frac{1\ LE}{100\ PT}$ (..........................)

ⓔ 21 pens : 1 pack (..........................) ⓕ $\frac{1\ cm}{10\ mm}$ (..........................)

ⓖ 1 km : 1000 m (..........................) ⓗ 5 L : 1 bottles (..........................)

ⓘ $\frac{7\ days}{1\ week}$ (..........................) ⓙ $\frac{1\ kg}{1,000\ gram}$ (..........................)

2 **Convert the following:**

ⓐ 5,700 m = ... km

ⓑ 1.8 ton = ...gram

ⓒ 4.1 PT = ...LE

ⓓ 5,500 mL = ...L

ⓔ 8.02 km = ...cm

ⓕ 25 cm = ...dm

ⓖ 180 minutes = ...hour

ⓗ 121,500 cm = ...km

ⓘ 4 weeks = ...hour

ⓙ 5200 dm = ...km

3 **Put (>,=, or <):**

ⓐ 520 km		52,000 m	ⓑ 170 minutes		3 hours
ⓒ 100 cm		10 dm	ⓓ 4 weeks		1,678 hours
ⓔ 780 PT		8 LE	ⓕ 2.5 ton		2,500 kg
ⓖ 700 mm		7m	ⓗ 5.005 kg		50,000 gram
ⓘ 12.5 dm		1.25 m	ⓙ 245 seconds		4 minutes

4 **Using the appropriate conversion factor convert the following unit rates:**

ⓐ 12 km/hr = ... = ...km/min

ⓑ 280 gram/sec = ... = ...kg/min

ⓒ 260 cm/sec = ... = ... m/min

ⓓ 12 km/hr = ... = ... m/min

ⓔ 24 cm per second = ... = ... meter/minute

ⓕ 18 kg per day = ... = ... gram/hr

ⓖ 3650 PT/gram = ... = ... LE/kg

ⓗ 45 m/min = ... = ... km/hr

5 **A tennis ball travels at 240 km/hr. Calculate its speed in km/min.**

....

....

6 **A person walks 15 km in 2 hours and 30 minutes. Calculate his average speed in meters per minute.**

....

....

7 **An athlete runs at a constant speed of 8 m/s, Calculate his average speed in kilometers per hour.**

....

....

8 **Convert the speed of each of the following animals to kilometers per hour. Then arrange them from slowest to fastest:**

Animal	Speed
Dog	571 meters per minute
Wild wolf	69 kilometers per hour
The hawk bird	680 centimeters per second
The great white shark	0.87 of a kilometer per minute

a. Dog = ... = ...km/hr

b. The hawk bird = ... = ...km/hr

c. The great white shark = ... = ... km/hr

Slowest			Fastest
....	....	....	....

Assessment on Lessons 4 – 6

Unit 10

1 Choose the correct answer:

a) 2.3 ton .... 2,300 kg (> or < or = or otherwise)

b) 24 km/hr = ... m/min (4000 or 400 or 40 or 2400)

c) 2.3 pounds = ... piasters (2300 or 230 or 23 or 2.3)

d) A cyclist runs at a speed of 42 km/hr, then his speed in meters per minute is ...... (7 or 70 or 700 or 42000)

e) 5200 dm = ... km (52 or 5.2 or 0.52 or 0.052)

2 Complete:

a) 71,500 cm = ... Km

b) 48 cm per second = ... meter/minute

c) 360.5 minutes .... 6 hours (> or < or =)

3 A swimmer swims at a constant speed of 3 m/s. Calculate his average speed in kilometers per hour.

....

....

4 There's a dog running at a constant speed of 48 km/hr, convert its speed into meters/min.

....

....

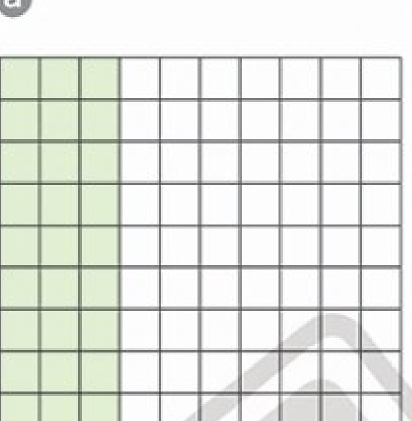
Unit 10 Unit Rate and Percent

Concept 10.3 Understand Percent

Lesson 7

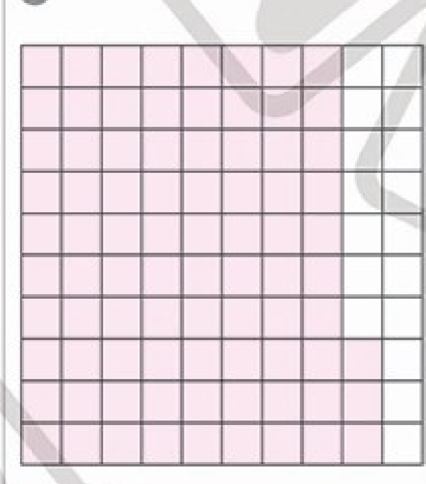
1 Write the percentage and fraction which represent the shaded part of the following shapes:

ⓐ



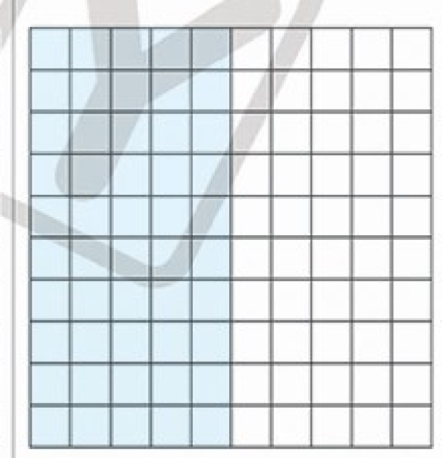
$\frac{\dots\dots}{100}$ = ... %

ⓑ



$\frac{\dots\dots}{100}$ = ... %

ⓒ

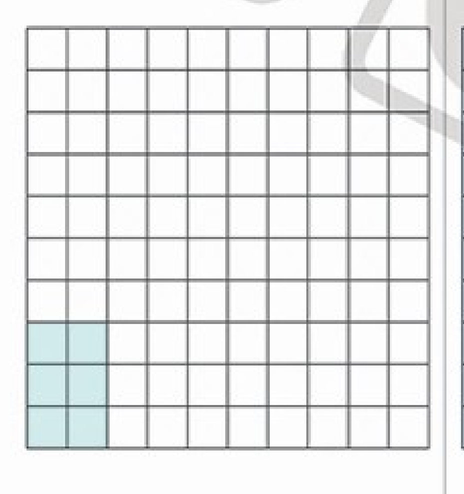


$\frac{\dots\dots}{100}$ = ... %





ⓓ



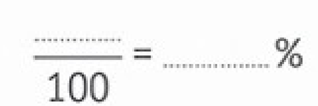
$\frac{\dots\dots}{100}$ = ... %

ⓔ

$\frac{\dots\dots}{100}$ = ... %

ⓕ

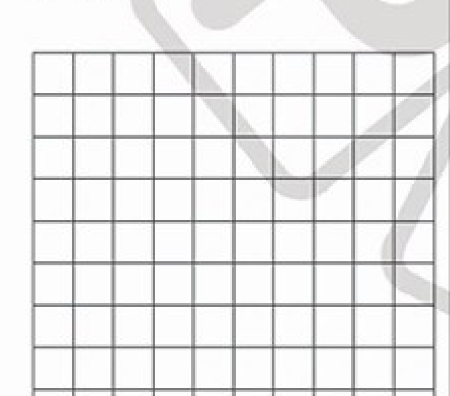
$\frac{\dots\dots}{100}$ = ... %



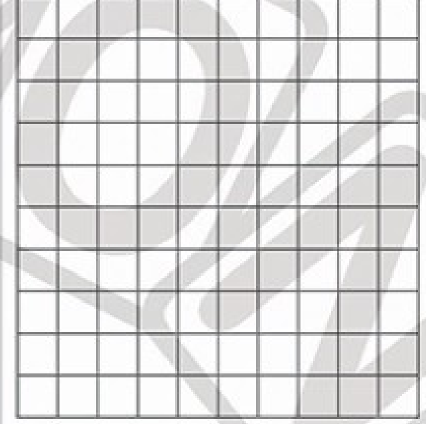
2 Shade according to the given percentage:



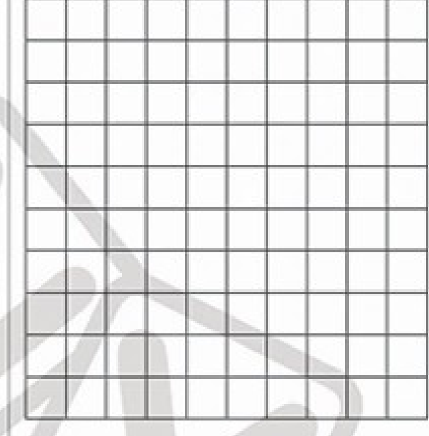
ⓐ 36 %



ⓑ 16 %

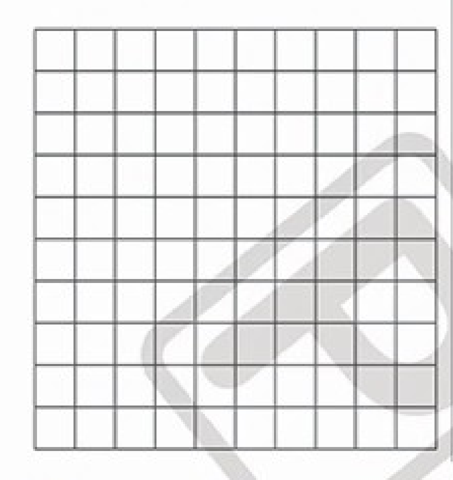


ⓒ 82 %

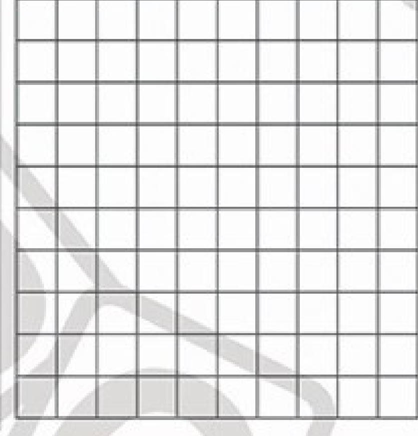




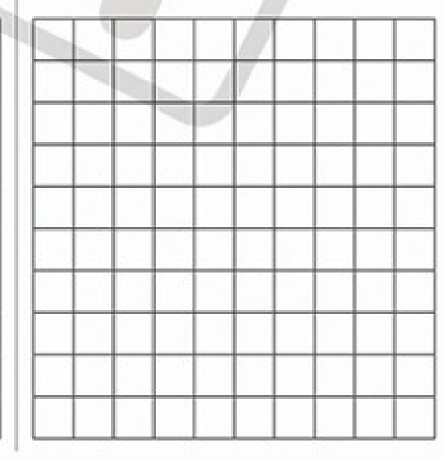
ⓓ 52 %



ⓔ 27 %



ⓕ 81 %



3 Convert the following fractions into percentages:

ⓐ $\frac{3}{4}$ = ...

ⓑ $\frac{2}{5}$ = ...

ⓒ $\frac{5}{8}$ = ...

ⓓ $2\frac{1}{4}$ = ...

ⓔ 1 = ...

f. $\frac{3}{20}$ = ...

g. $\frac{3}{24}$ = ...

h. $\frac{4}{5}$ = ...

i. $\frac{7}{10}$ = ...

j. $3\frac{1}{5}$ = ...

4 Convert the following percentages into fractions in the simplest form:

a. 22% = ...

b. 80% = ...

c. 36% = ...

d. 12.5% = ...

e. 275% = ...

f. 100% = ...

g. 68% = ...

h. 1.2% = ...

i. 0.2% = ...

j. 59% = ...

5 Convert the following decimals into percentages:

a. 0.5 = ...

b. 0.01 = ...

c. 1.07 = ...

d. 0.47 = ...

e. 0.12 = ...

f. 6.25 = ...

6 If the percentage of students who succeeded in the science exam is 87%, find percentage of students who failed.

....

....

7 If the percentage of the number of girls in a school is 67%, find the percentage of the number of boys in the school.

....

....

8 If there are 36 pupils playing in the playground, 25% of them are wearing red t-shirts, and the rest are wearing blue t-shirts, find the percentage of pupils who are wearing blue t-shirts.

....

....

9 In a survey of 80 people, if the percentage of people who chose Al-Ahly Club as their favorite club is 78%, find the percentage of people who don't choose Al-Ahly Club.

....

....

10 Ibrahim ate $\frac{3}{5}$ of a pizza. Find the percentage of the part that he didn't eat.

....

....

Assessment on Lesson 7

Unit 10

1 **Choose the correct answer:**

ⓐ $\frac{2}{8}$ = ... % (35 or 45 or 12.5 or 25)

ⓑ $1\frac{1}{4}$ = ... % (25 or 12.5 or 125 or 1250)

ⓒ 37% = ... ($\frac{3.7}{100}$ or 37 or 0.37 or 3700)

ⓓ 225% = ... ($1\frac{25}{100}$ or $2\frac{25}{200}$ or $2\frac{1}{4}$ or 0.225)

ⓔ $\frac{3}{6}$ = ... % (30 or 25 or 50 or 60)

2 **Complete:**

ⓐ $\frac{23}{25}$ = ... %

ⓑ 0.29 = ... %

ⓒ 2.15 = ... %

ⓓ $1\frac{15}{100}$ = ... %

3 **In a company, the number of men is $\frac{6}{8}$ of all employee, then what is the percentage of men in this company?**

....

....

Lessons 8-10 Part (1)

1 By using given values, complete the table:

a In a class of 40 students, only 20% of the students are participating in an art competition. How many students are not taking part in the competition?

....

....

Whole	Part	Percent
....	....	....

b If a baseball team has lost 45 matches out of the 120 matches played in total, find out their winning percentage.

....

....

Whole	Part	Percent
....	....	....

c If there are 20 girls in a class with a percentage of 40%, find out the number of students in the class.

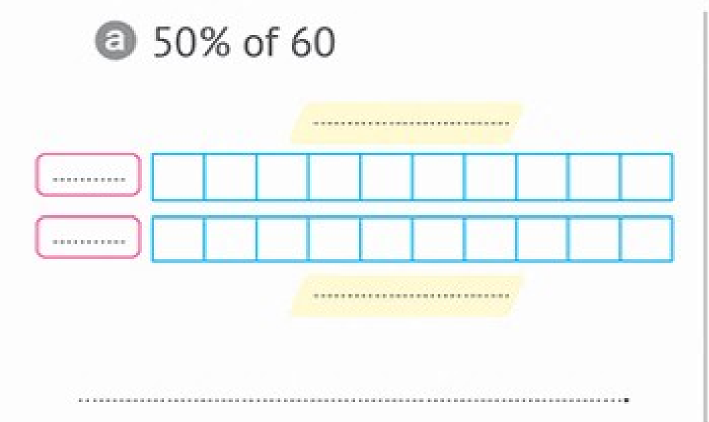
....

....

Whole	Part	Percent
....	....	....

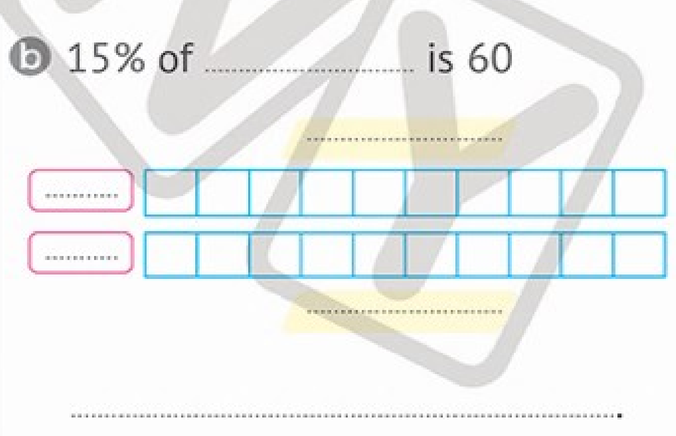
2 By using tape diagrams, find the following:

a 50% of 60



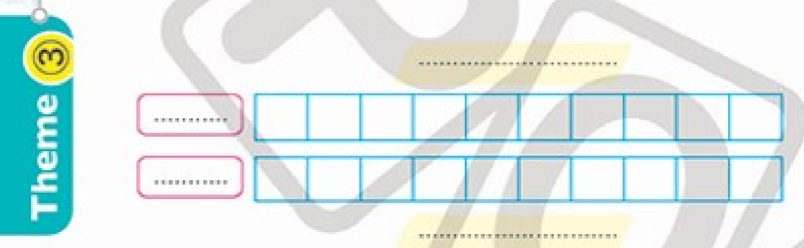
....

b 15% of .... is 60

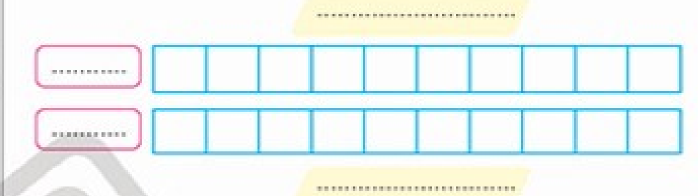


....

ⓒ 90% of .... is 108



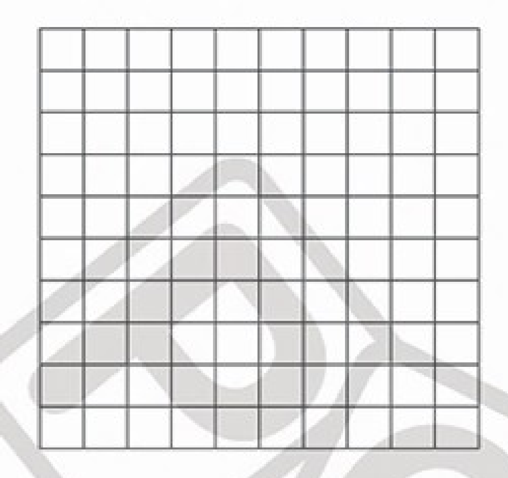
ⓓ 30% of 600



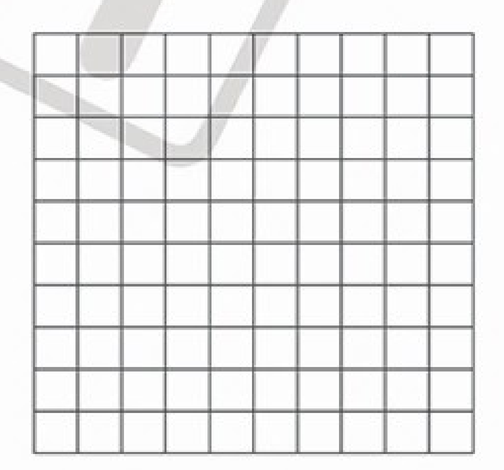
....

3 By using a **10 by 10 grid**, find the following:

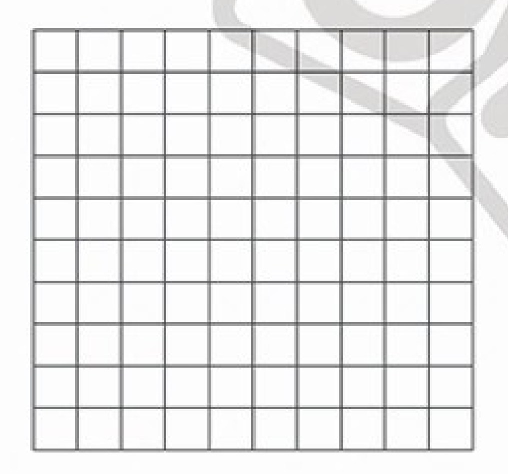
ⓐ 15% of 400



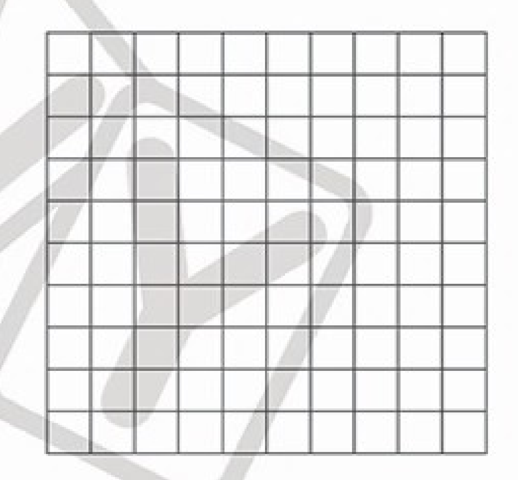
ⓑ 10% of .... is 70



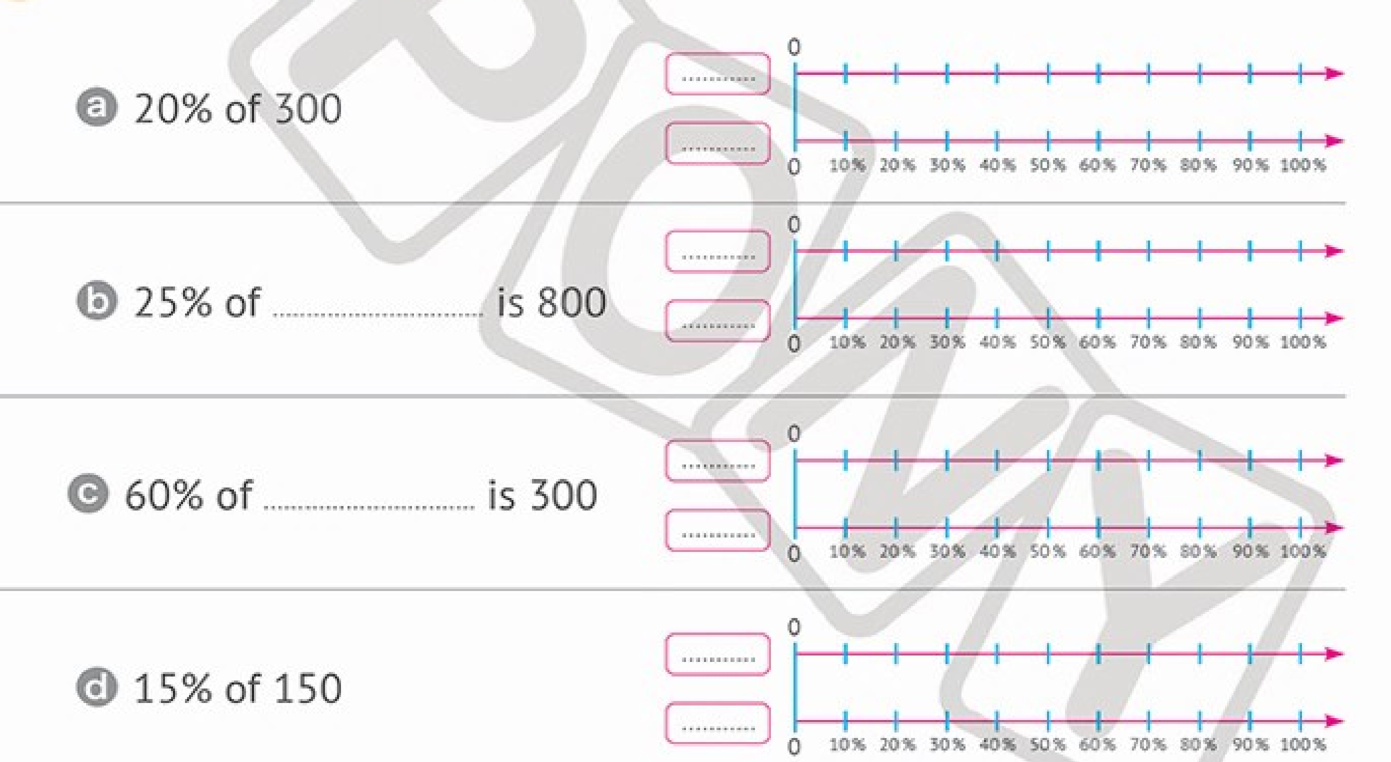
ⓒ 20% of .... is 64



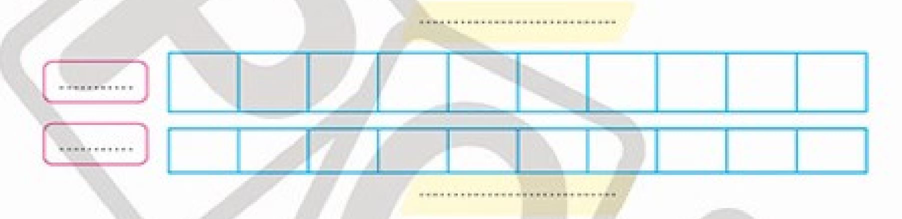
ⓓ 35% of 300



4 By using **tape diagrams**, find the following:

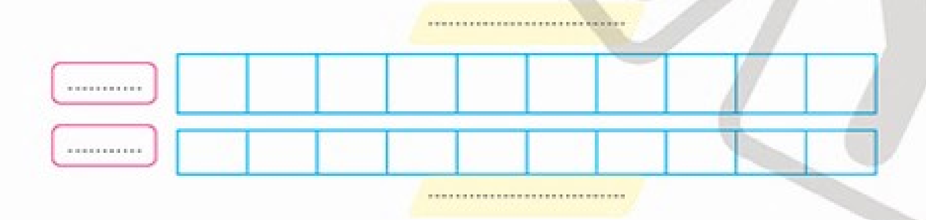


5 Hassan spends **70%** of his monthly salary and saves **270** LE. Find his monthly salary. (Using a tape diagram)



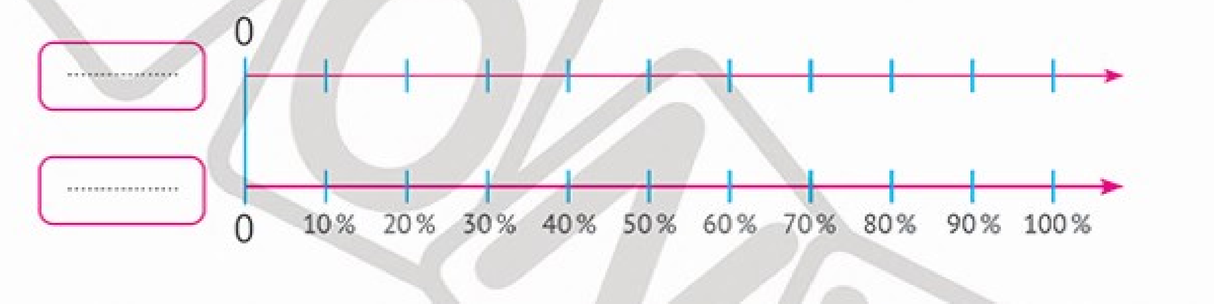
....

6 If **120** children out of **150** are going to a fair organized by a school, then find the percentage of children not visiting the fair. (Using a tape diagram)



....

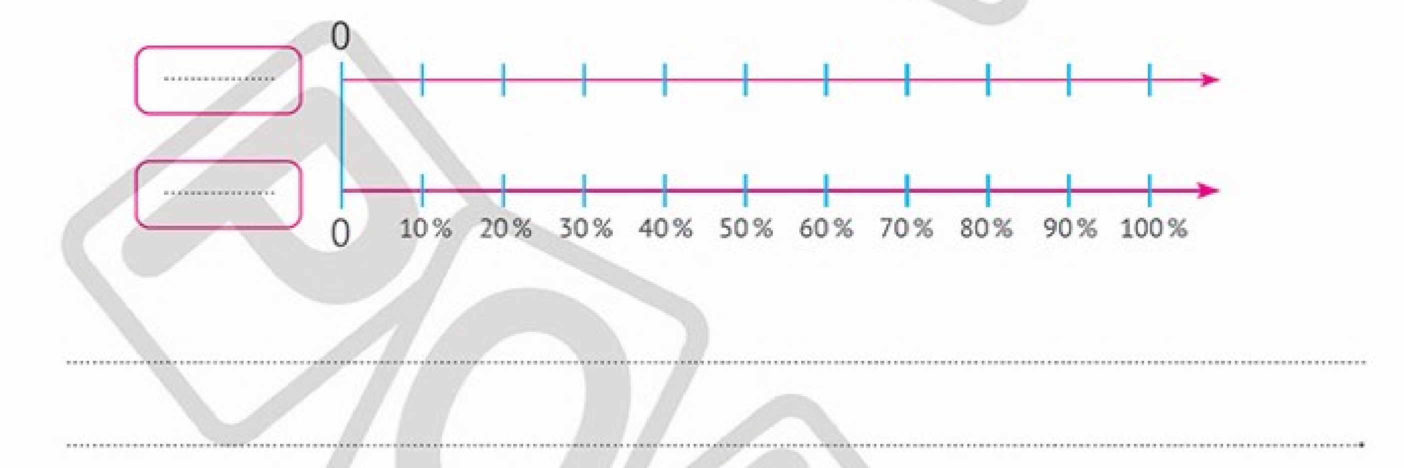
7 Due to leakage, 30% of the water was lost from a water tank. If only 240 liters of water are left in the tank now, find the total capacity of the water tank. (Using double line)



....

....

8 If there are 40% of math books in a school library containing 1,800 books in total, find the number of math books in the library.



....

....

Assessment on Lessons 8 – 10 Part(1)

Unit 10

1 Choose the correct answer:

a) 10 % of ………… = 24 (480 or 240 or 10 or 2.4)

b) 35% of 160 = ………… (56 or 5.6 or $\frac{56}{100}$ or 560)

c) 1 – 1% = ………… % (zero or 2 or 99 or 1)

d) 35% of ………… = 70 (2 or 20 or 200 or 2000)

e) $2\frac{1}{5}$ = ………… % (20 or 120 or 220 or 12)

2 Complete:

a) A number which 18% of it equals 54 is …………

b) 75% of 200 = …………

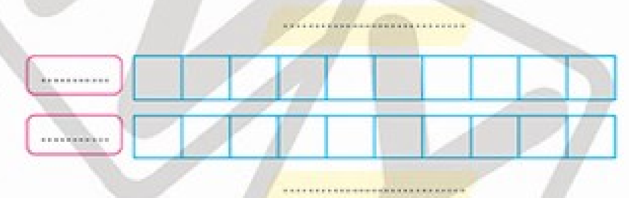
c) There are 60 students in a class. If the percentage of girls is 40%, then the number of boys is …………

3 A box contains 80 tomatoes, of which 16 are rotten. Find the percentage of the tomatoes that are in good condition.

(Using a tap diagram)

……………………………………………………………

……………………………………………………………



Lessons 8-10 Part (2)

1 Complete the following:

a) If 10% of a number is 36, then the number is ....

b) The value of 35% of 540 is ....

c) 9 % of .... = 63

d) 80% of 60 = ...

e) 1 − 37% = ...

f) $\frac{3}{4}$ = ... %

g) .... % of 180 = 45

h) $1\frac{3}{5}$ = ... %

2 Choose the correct answer:

a) 30% of .... = 240 (200 or 400 or 600 or 800)

b) 15% of 320 = ... % (48 or 32 or 480 or 0.48)

c) 1− (27% + 35%) = ... % (32 or 35 or 38 or 42)

d) 30% of a number equals............

(its third or its three tenths or its three fifths or its three sevenths)

e) 20% of a number = ... % of half the same number

(10 or 20 or 30 or 40)

f) 10% of 850 = ... (8.5 or 85 or 0.85 or 850)

g) 90 % of .... = 360 (0.4 or 4 or 40 or 400)

h) 5% of .... = 5 (25 or 50 or 100 or 125)

i) 45% of a kilometer = ... m (450 or 4500 or 45 or 0.45)

3 An employee saves 900 LE monthly. If his monthly income is 3,600 LE.

ⓐ Find the percentage of what he saves monthly.

ⓑ Find the percentage of what he spends monthly.

....

....

4 The number of students is 880; one day, 7.5% were absent. Find the number of present students that day.

....

....

5 Engy bought a car for 70,000 LE. She paid 20% of its price. How much money did she pay?

....

....

6 The price of a kilogram of banana has increased from 12 LE to 15 LE. What is the percentage of the increase?

....

....

7 Emma had 200 marbles. of which she gave 40 to Omar. Find the percentage of marbles left with Emma now.

....

....

8 A group of 80 students went on a picnic. 15% of them were girls. How many girls were there in the group?

....

....

Assessment on Lessons 8 – 10 Part(2)

Unit 10

1 Choose the correct answer:

ⓐ 45% of 600 = ... (250 or 260 or 270 or 450)

ⓑ 5% of .... LE = 120 LE (240 or 2400 or 1200 or 120)

ⓒ $1 - \frac{1}{4}$ = ... % (75 or 7.5 or $\frac{3}{4}$ or 0.75)

ⓓ $100\% - \frac{3}{4}$ = ... (0.25 or 25 or 2.5 or 250)

ⓔ If 100% of a number is 15, what is 50% of this number?

(50 or 7.5 or 5000 or 15)

2 Complete:

ⓐ Belal scored 570 marks out of 600. Then the percentage of marks scored is ....

ⓑ 35% of 660 = ...

ⓒ 61% of a kilogram = ... Gram

ⓓ 1 – (37 % + 13%) = $\frac{\dots\dots}{\dots\dots}$ (in the simplest form)

ⓔ If there are 50 students in class and 96% of them passed, then the students who failed the test (in numbers) are .... students.

3 There are 2,375 students in a school, of which 950 are girls and the rest are boys. Calculate the percentage of boys.

....

....

Lesson 11

1 Complete the table by determining 10% of the original price:

Original Price	30 LE	45 LE	23 LE	124 LE	6,000 LE
10% of the Price	....	....	....	....	....

What do you notice about the relationship between the original price and 10% of the price?

....

....

2 Complete the table by determining 10% of the original price:

Original Price	10% of the Price	Original Price	10% of the Price
50 LE	.... LE	42 LE	....
140 LE	.... LE	320 LE	....
9 LE	.... LE	5.3 LE	....

Now, use the values you found for 10% to find these percents.

ⓐ What is 20% of 42 LE ? .... LE

ⓑ What is 30% of 320 LE? .... LE

3 Determine the value of 10% of each price, then use it to complete the following table:

Item and Price	Percent off	Savings	Sale Price
Shoes: 1400 LE	20%	.... LE	.... LE
T-shirt: 900 LE	30%	.... LE	.... LE
Jeans: 500 LE	40%	.... LE	.... LE
Watch: 1600 LE	25%	.... LE	.... LE

4 A laptop that costs 24,500 LE is 20% off. What is the sale price?

....

....

5 A discount of 10% was made on the price of a book. The original price was 140 LE. Find the sale price.

....

....

6 The price of a mobile before the discount was 14,000 LE. If there's a discount of 35%, find the sale price of the mobile.

....

....

7 If the original price of a meal is 450 LE, if there's a tax of 15%, Calculate the price of the meal after adding tax.

....

....

8 If the price of shoes is 1,200 LE, if there's an extra tax, 20% will be added to it. Find the price of the shoes after adding tax.

....

....

9 A piece of cloth, 20 meters long, was put in water; it shrank by 4%. What is the length after shrinking?

....

....

Assessment on Lesson 11

Unit 10

1 **Choose the correct answer:**

ⓐ The value of 10% of 120 LE is .... (120 or 12 or 1.2 or 10)

ⓑ The value of 5% of 4200 LE is .... (420 or 42 or 12 or 210)

ⓒ If the original price of a dress is 1,700 LE, then its sale price after apply a discount 20% is .... (1,360 or 340 or 170 or 17)

ⓓ In a restaurant there's 5% added to each meal as service, If the price of a meal is 160 LE, then the price of meal after adding service is .... LE (168 or 152 or 5 or 178)

2 **If the price of jeans is 720 L.E, if there's 35% percent off, calculate the price of two jeans.**

....

....

3 **There are 1,800 students in a school, out of which 720 are girls and the rest are boys. Calculate the percentage of boys.**

....

....

Assessment 1 on



First: Choose the correct answer:

1. Ahmed studies 24 pages in 6 hours, then the unit rate of his study is .... pages per hour. (5 or 4 or 3.5 or 5.5)
2. $1 - \frac{3}{4}$ = ... % (25 or 2.5 or $\frac{1}{4}$ or 0.25)
3. The value of 30% of 120 equals .... (50 or 75 or 36 or 100)
4. The percentage that represents 650 LE of 1,000 LE is .... (650% or 65% or 350% or 35%)
5. 5.32 m = ... cm (0.0532 or 523 or 532 or 5320)

Second: Complete:

1. 54 cm per second = ... meter/minute
2. 60 % of .... LE = 360 LE
3. $1\frac{4}{8}$ = ... %.
4. 540 minutes = ... hours
5. A printer prints 27 papers in 3 minutes, then it prints .... papers in a minute.

Third: An iPad that costs 20,800 LE with discount of 20% off. Find: (using tape diagram)

1. The money saved.
2. The sale price of the iPad.



Assessment 2





Unit 10

First: **Choose the correct answer:**

1. 20% .... $\frac{2}{5}$ (> or < or = or ⩽)
2. The value of 10 % of 4,200 LE is .... (420 or 42 or 12 or 210)
3. 90 % of .... = 360 (0.4 or 4 or 40 or 400)
4. 225% = ... ($1\frac{25}{100}$ or $2\frac{25}{200}$ or $2\frac{1}{4}$ or 0.225)
5. Noah spends 48 pounds in 6 days, then he will spend ...... L.E in 10 days. (240 or 60 or 80 or 40)

Second: **Complete:**

1. A number which 18% of it equals 72 is ....
2. 50 m/min = ... = ... km/hr
3. 1 – 9% = ... %
4. Gehan scored 540 marks out of 600. Then the percentage of marks scored is ....
5. 7.45 m = ... cm

Third: **A factory (A) produces 600 lamps in 40 hours, another factory (B) produces 700 lamps from the same kind in 50 hours, Which factory has a better rate of production?**

....

....

Theme

4

Applications of Geometry and Measurement



Theme Units

Unit 11 Coordinate Plane

Concept 11.1: Understand the Coordinate Plane

Concept 11.2: Use Coordinate Geometry

Unit 12 Area of Some Polygons

Concept 12.1: Find Area of Parallelogram, Triangle, and Trapezium

Unit 13 Surface Area and Volume

Concept 13.1: Use Nets to Find Surface Area

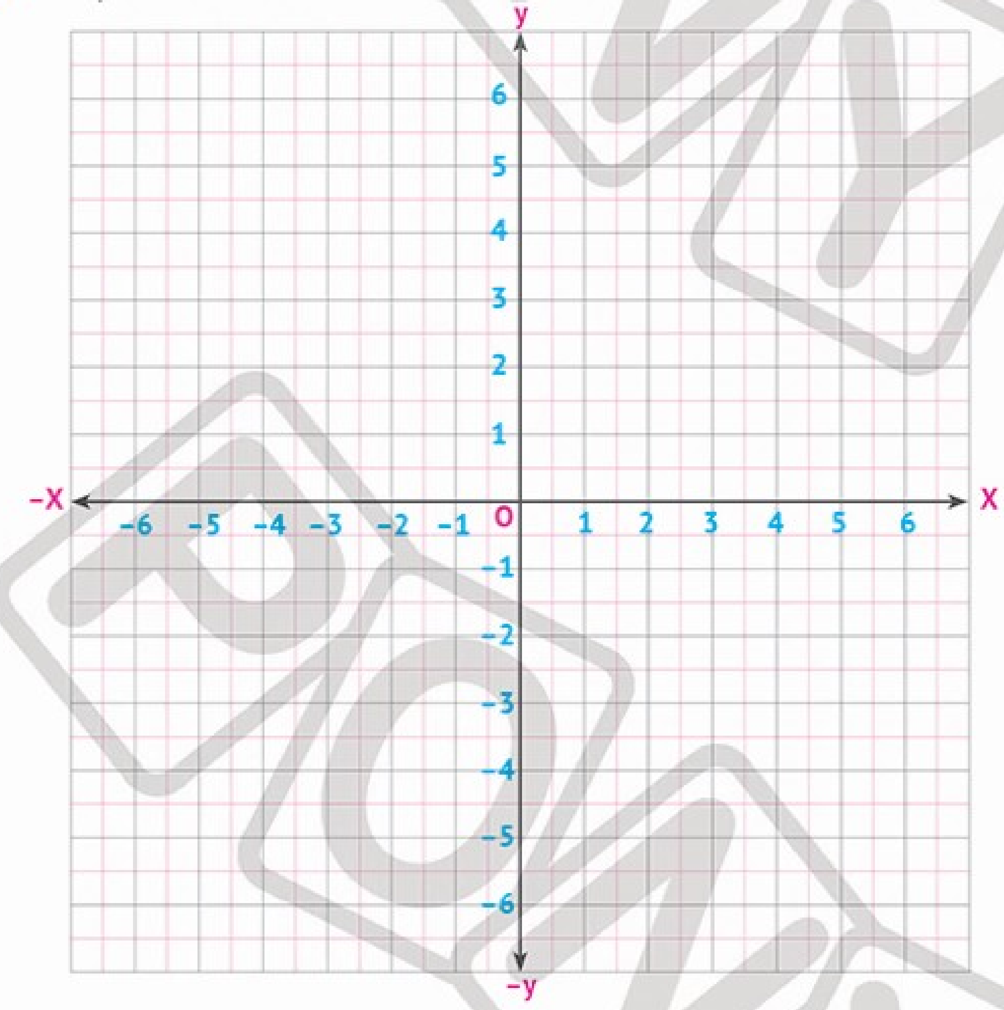
Concept 13.2: Calculate Volume

Unit 11 Coordinate Plane

Concept 11.1 Understand the Coordinate Plane

Lessons 1-3

1 Locate the following points, then determine which quadrant or axis the points are in:



ⓐ $(-2, 1)$: ....

ⓑ $(1, 5)$: ....

ⓒ $(-5, 0)$: ....

ⓓ $(-4, -3)$: ....

ⓔ $(0, 5)$: ....

ⓕ $(2, -5\frac{1}{4})$: ....

ⓖ $(4, 0)$: ....

ⓗ $(-2, -1)$: ....

ⓘ $(-2, 3\frac{1}{4})$: ....

ⓙ $(5, 2)$: ....

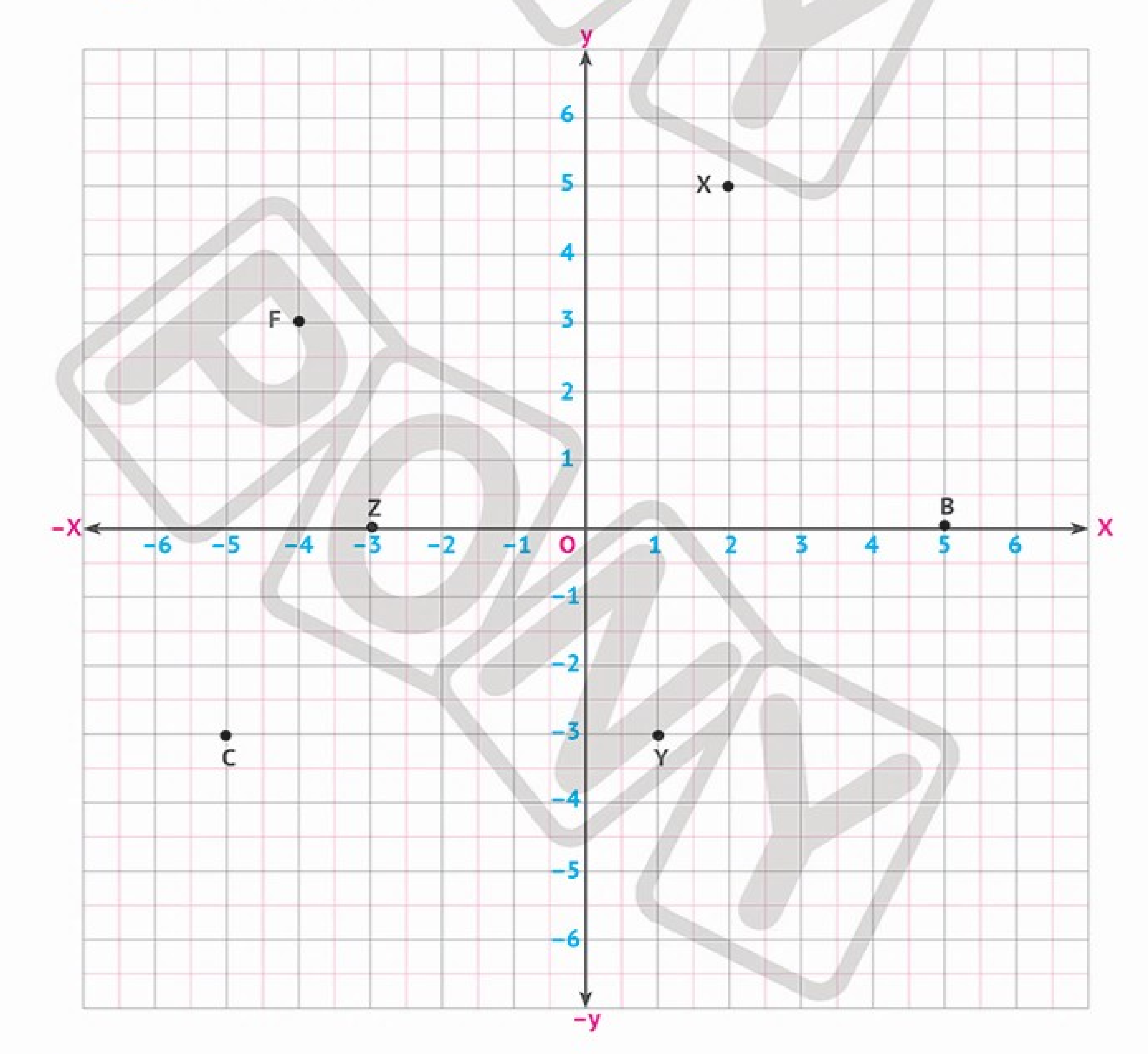
2 By using the following coordinate plane:

ⓐ Locate the following points:

- M (2 , − 5)
- U (1 , 0)
- R (0 , − 8)
- A ($5\frac{1}{2}$, − 5)

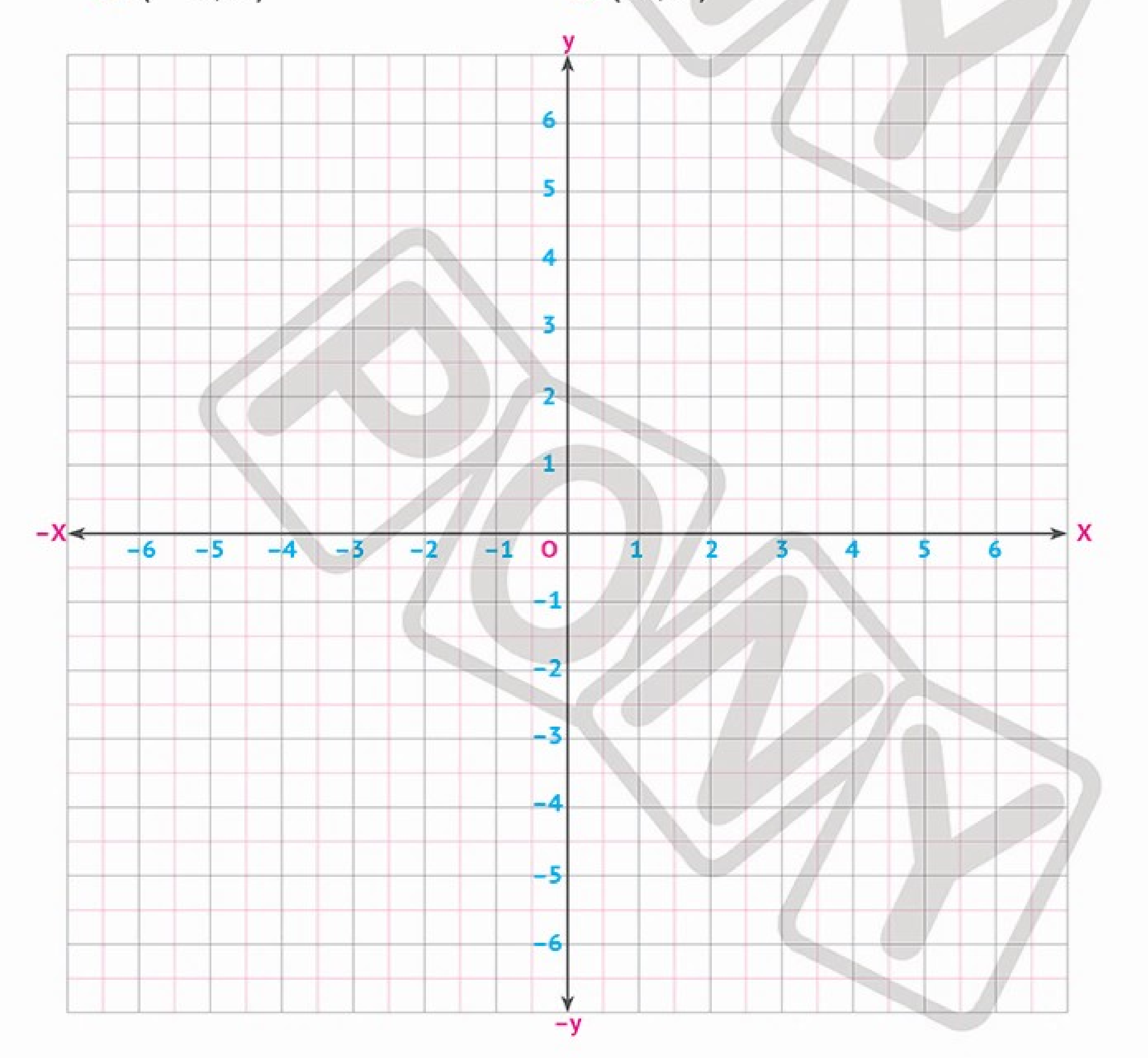
ⓑ Write the ordered pair that represents each of the following points:

- X (.............., ...)
- Y (.............., ...)
- Z (.............., ...)
- F (.............., ...)
- B (.............., ...)
- C (.............., ...)

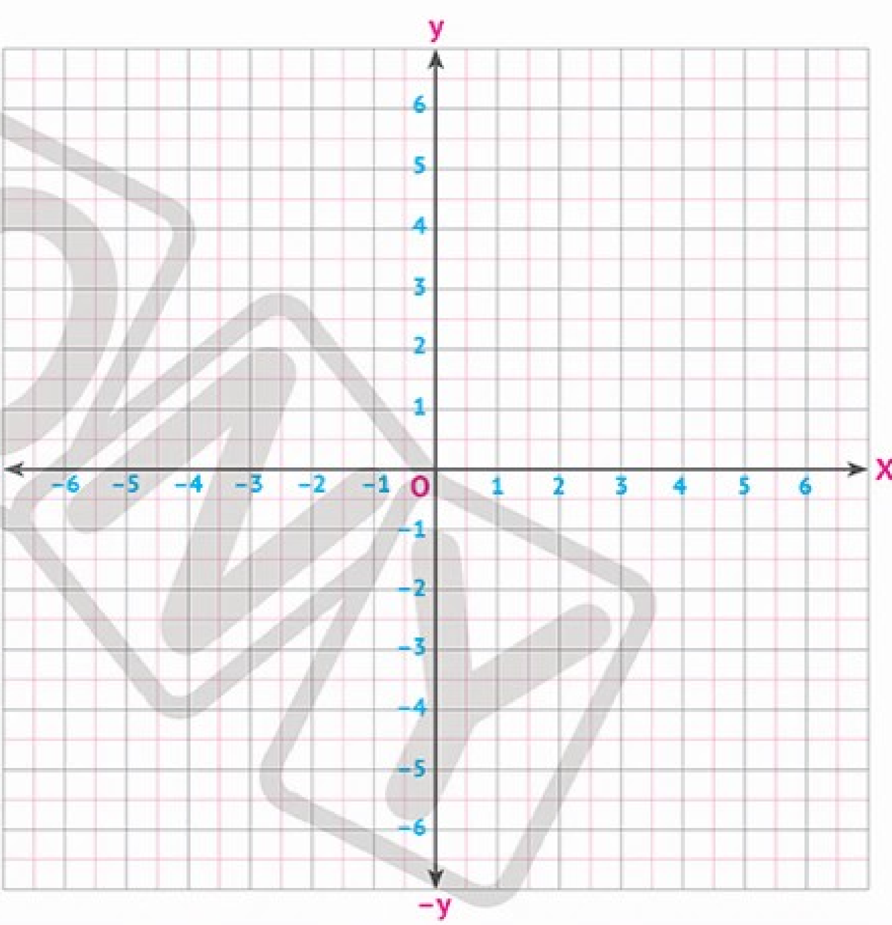


3 By using the following coordinate plane, **locate** the following ordered pairs on it:

- A (5 , 7)
- B (− 3 , 1)
- C (0 , − 2)
- D (1 , 1)
- E (− 1 , 4)
- F (0 , 0)
- G (1 , − 3)
- H $(-3 , -4\frac{1}{2})$
- I (− 5 , 0)
- J (2 , 2)



4 **Locate the following points on the coordinate plane, then find the image of each point by reflection on x-axis and y-axis:**



Point	The Image of a Point by Reflection on	
	Y-axis	X-axis
A (− 4 , 2)	(............, ...)	(............, ...)
B (0 , − 2)	(............, ...)	(............, ...)
C (5 , 1)	(............, ...)	(............, ...)
D ($-1\frac{1}{2}$, − 2)	(............, ...)	(............, ...)
E (− 7 , 0)	(............, ...)	(............, ...)
F (5 , − 2)	(............, ...)	(............, ...)
G (− 3 , 4)	(............, ...)	(............, ...)
H (2 , $-4\frac{1}{4}$)	(............, ...)	(............, ...)
I (3 , 7)	(............, ...)	(............, ...)
J (− 6 , 1)	(............, ...)	(............, ...)
K (− 7 , − 5)	(............, ...)	(............, ...)

5 Complete:

a) The image of the ordered pair (5 , −2) by reflection on the x-axis is ....

b) The image of the ordered pair (−7 , −1) by reflection on the y-axis is ....

c) Point A (2 , − 5) lies in the .... quadrant.

d) Point C (0 , 3) lies on .... y-axis.

e) If the image of a point by reflection on the y-axis is (−2 , 4), then the point is ....

f) The image of the point (2 , 0) by reflection on the x-axis is ....

g) The image of the point (2 , −5) by reflection on .... is (−2 , −5).

h) The image of the point (0 , −7) by reflection on the y-axis is ....

6 Choose the correct answer:

a) All the following lie in the 4th quadrant, except ....

((2 , − 3) or (− 4 , − 3) or (5 , − 1) or (1 , − 1))

b) If the point (x , −7) lies in the 3rd quadrant, then the value of x is ....

(2 or 4 or −1 or 1)

c) The point .... lies on the x-axis.

((2 , − 3) or (0 , − 3) or (4 , − 1) or ($1 \frac{1}{4}$, 0))

d) The point .... lies on the y-axis.

((2 , − 7) or (0 , − 7) or (1 , − 1) , (5 , 0))

e) Which of the following lies in the 2nd quadrant?

((2 , − 7) or (0 , − 1) or (− 1 , 9) , (7 , 0))

f) The image of the point (0 , 5) by reflection on the y-axis is ....

((5, 0) or (0 , − 5) or (5 , − 5) or itself)

Assessment on Lessons 1–3

Unit 11

1 Choose the correct answer:

ⓐ The point .... lies on the x-axis.
((5 , −1) or (0 , −7) or (4 , 0) or (4 , 2))

ⓑ If the point (x , 6) lies in the 1st quadrant, then the value of x is ....
(− 1 or − 4 or − 3 or 1)

ⓒ If the image of a point by reflection on the y-axis is (− 1 , 5), then the point is ....
((5 , − 1) or (1 , 5) or (− 1 , − 5) or (1 , − 5))

ⓓ The image of the point (2 , −9) by reflection on x-axis is ....
((2 , 9) or (− 9 , 2) or (− 2 , − 9) , (− 2 , 9))

2 Complete:

ⓐ The x-coordinate of any point that lies on the y-axis is ....

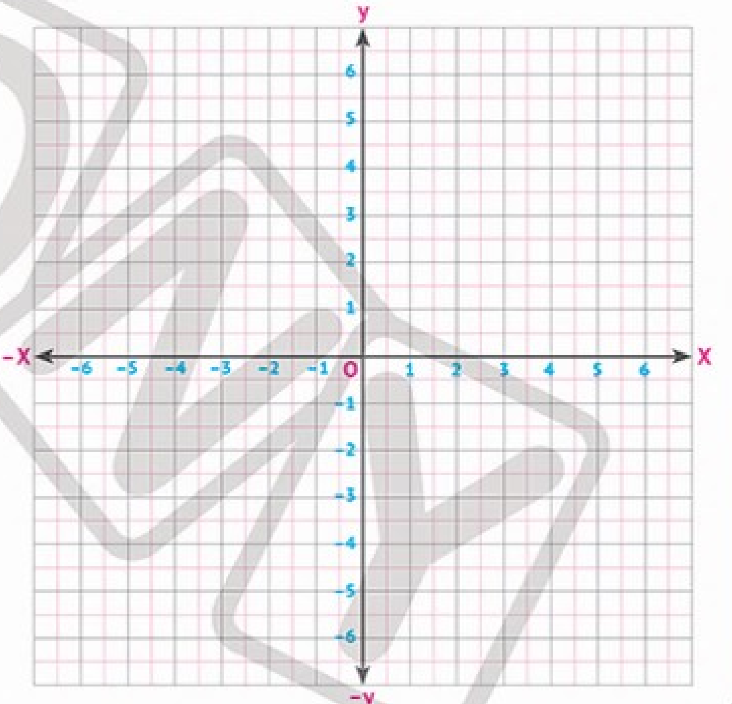
ⓑ The image of the point (2 , 0) by reflection on the x-axis is ....

ⓒ The image of the point (4 , −3) by reflection on .... is (−4 , −3).

ⓓ Point C(5 , − 3) lies in the .... quadrant.

3 Using the following coordinate plane, locate the following ordered pairs:

- A (5 , −3)
- B (0 , 5)
- C (− 7 , 1)
- D $(-1\frac{1}{2}, -3)$
- E (− 2 , 0)
- F (1 , 1)



Concept 11.2 Use Coordinate Geometry

Lessons 4&5

1 **Using the following horizontal number line, complete the following:**

D at -7, A at -4, B at -1, E at 0, F at 2, C at 4, H at 7 (number line from -7 to 8)

a. The distance between A and B is ....

b. The distance between C and F is ....

c. The distance between D and A is ....

d. The distance between B and H is ....

e. The distance between E and B is ....

f. The distance between H and F is ....

g. The distance between A and C is ....

h. The distance between E and F is ....

2 **Using the following vertical number line, complete the following:**

a. The distance between X and Z is ....

b. The distance between K and Y is ....

c. The distance between C and G is ....

d. The distance between G and X is ....

e. The distance between D and Z is ....

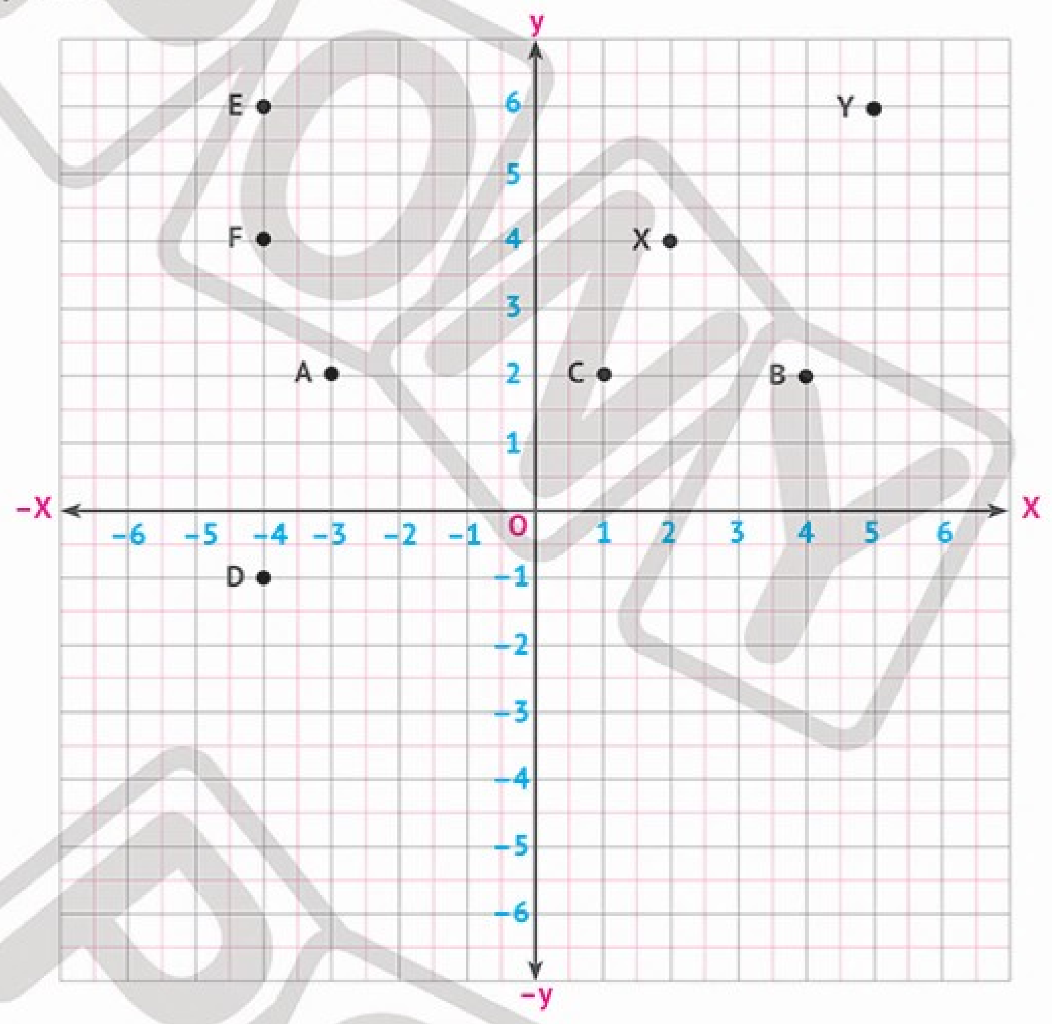
f. The distance between K and G is ....

g. The distance between C and X is ....

h. The distance between D and Y is ....

C at 8, D at 6, G at 5, Y at 3, X at 1, K at -2, Z at -4 (number line from -4 to 8)

3 Using the following coordinate plane, find the **distance** between the two points:



ⓐ A (............, ...) and B (............, ...) = ... units

ⓑ B (............, ...) and C (............, ...) = ... units

ⓒ D (............, ...) and E (............, ...) = ... units

ⓓ E (............, ...) and F (............, ...) = ... units

ⓔ A (............, ...) and C (............, ...) = ... units

ⓕ X (............, ...) and F (............, ...) = ... units

ⓖ E (............, ...) and Y (............, ...) = ... units

ⓗ F (............, ...) and D (............, ...) = ... units

4 Find the distance of the following points:

a) A (4 , 7) , B (− 5 , 7) , then AB = ... units

b) X (−3 , −2) , Y (−3 , 5) , then XY = ... units

c) C (0, −9) , D (0 , 1) , then CD = ... units

d) Z (4 , 2) , F (-4 , 2) , then ZF = ... units

e) A (6 , 0) , B (−2 , 0) , then AB = ... units

f) E (−5 , 1) , F (−5 ,-1) , then EF = ... units

Assessment on Lessons 4&5

Unit 11

1 Complete:

ⓐ The distance between A(3 , 7) and D(-2 , 7) is .... units.

ⓑ The distance between X(- 4 , 5) and Y(-4 , -5) is .... units.

ⓒ The smaller the value of the y-coordinate, ... the point is to the x-axis.

ⓓ If the point (3 , 0) moved 3 units in the positive direction of the y-axis, it becomes ....

ⓔ If the point (2 , 8) moved 2 units in the negative direction of the x-axis, it becomes ....

ⓕ The distance between A (3 , 4) and x-axis is .... units.

2 Locate the following points on the coordinate plane, then find:

A (5 , −2) , B (1 , 4) , C (5 , 3) , D (− 1 , 4) , E (5 , − 5) , F (1 , 3)

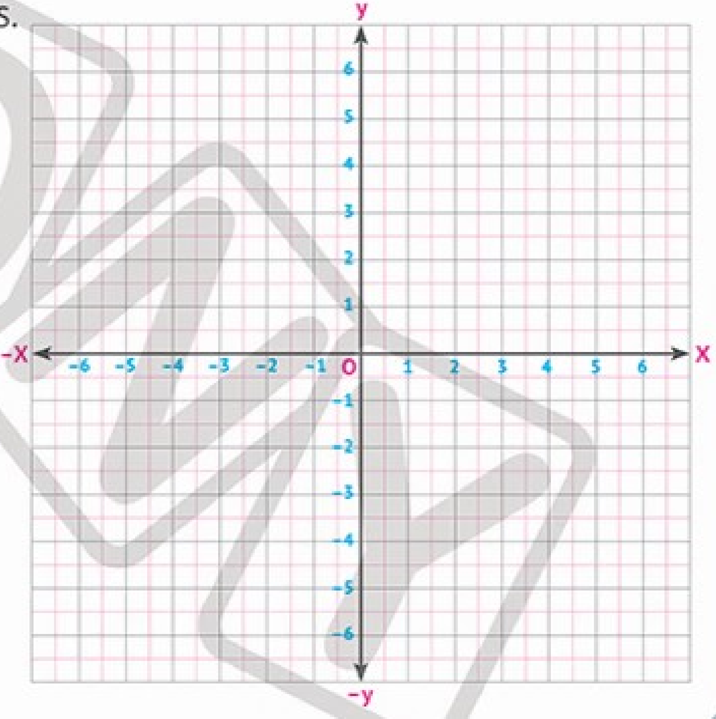
ⓐ The length of AC = ... units.

ⓑ The length of BD = ... units.

ⓒ The length of CF = ... units.

ⓓ The length of EC = ... units.

ⓔ The length of AE = ... units.



Lesson 6



1 **Using graph paper, plot each set of points, then match each set of vertices to the shape it represents:**

Shape (1): { (2 , 0) , (5 , 0) , (5 , 4)}

Shape (2): {(1 , 1) , (1 , 3) , (-4 , 3) , (-4 , 1)}

Shape (3): {(2 , -1) , (2 , -4) , (5 , -4) , (5,-1)}

Shape (4): {(1 , -2) , (1,-5) , (-5 , -2) , (-5 , -5)}

y

6
5
4
3
2
1

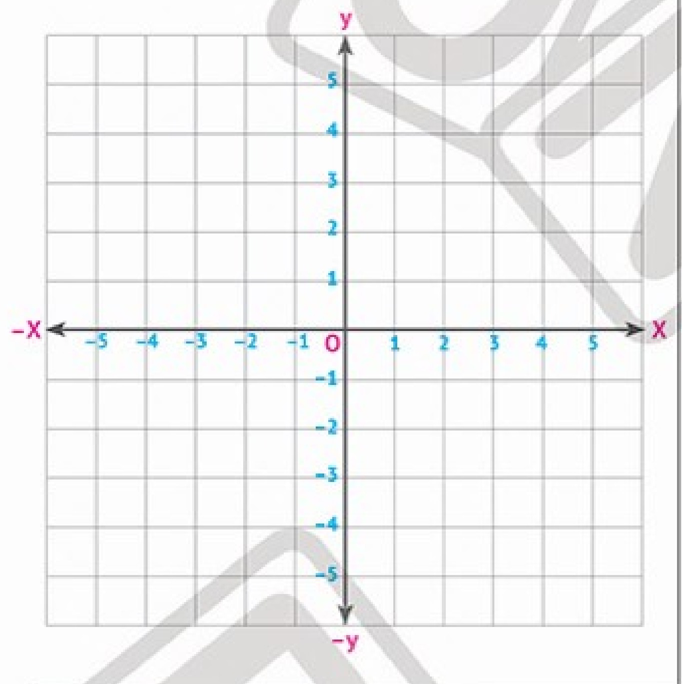
-X -5 -4 -3 -2 -1 0 1 2 3 4 5 X

-1
-2
-3
-4
-5

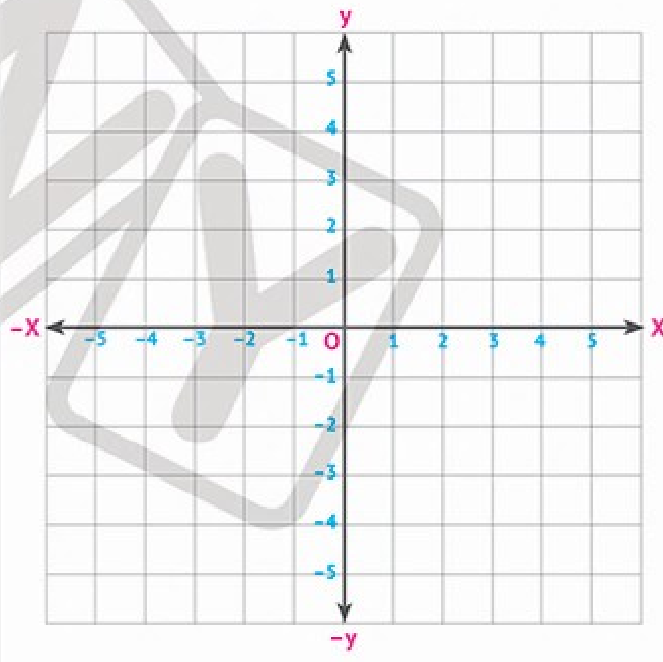
-y

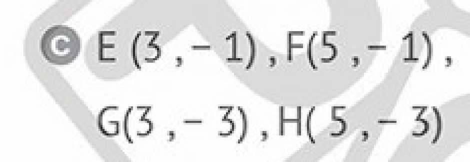
2 **Locate the following ordered pairs, then connect them to create a geometrical shape:**

ⓐ A (1 , 2) , B (1 , -4) , C (−3 , −4) , D (−3 , −2)

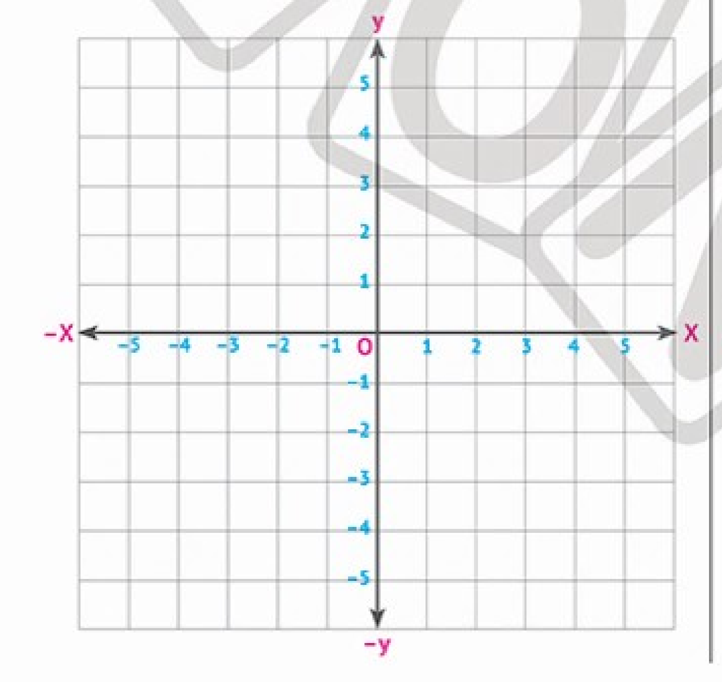


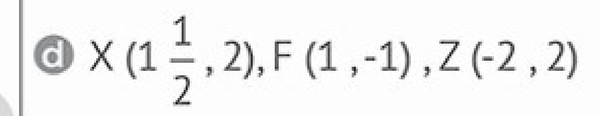
ⓑ X (0 , 0) , Y (4 , 3) , Z (4 , 0)



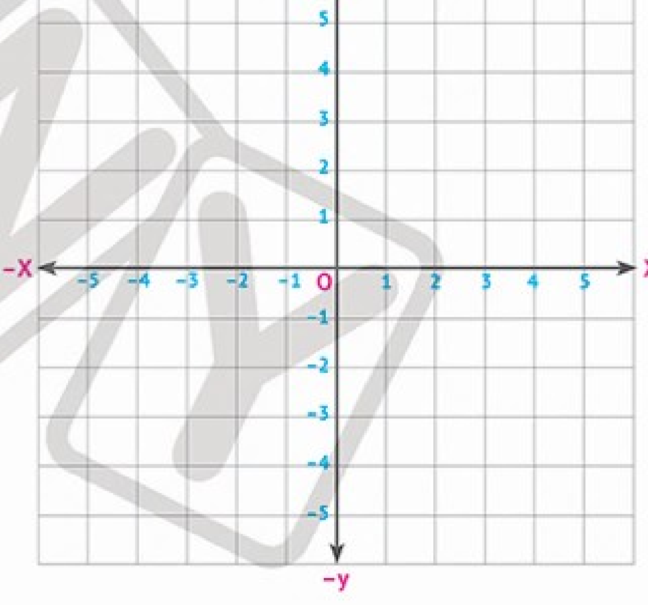


ⓒ E (3 , − 1) , F(5 , − 1) , G(3 , − 3) , H(5 , − 3)



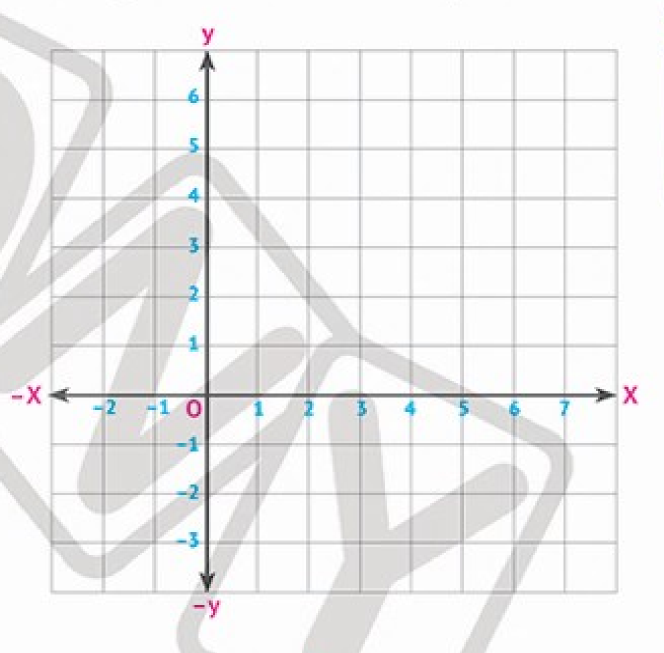


ⓓ X ($1\frac{1}{2}$, 2), F (1 , -1) , Z (-2 , 2)

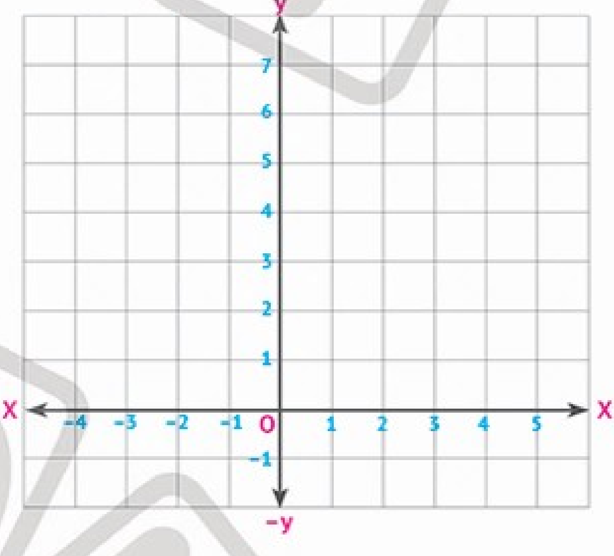


3 By using the identified point on the coordinate plane, determine the other points to create the required geometrical shapes:

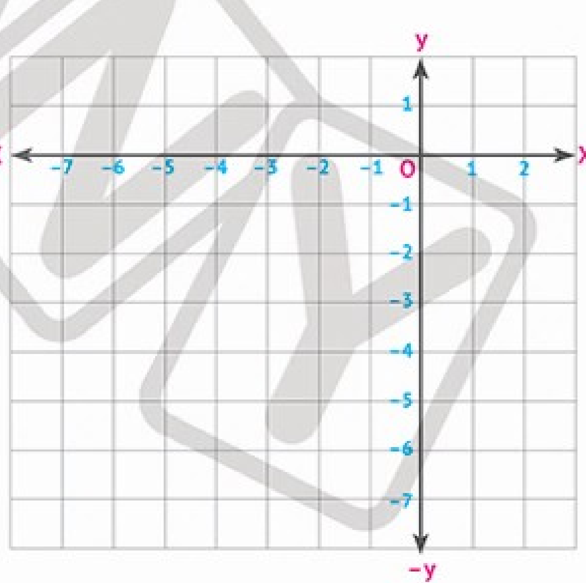
ⓐ The point (2 , 1) is a vertex of a square 4 units in length. Determine another 3 points to complete the square:



ⓑ The point (0 , 3) is a vertex of a right-angled triangle with leg sides 3 and 4 units long. Determine another 2 points to complete the triangle.

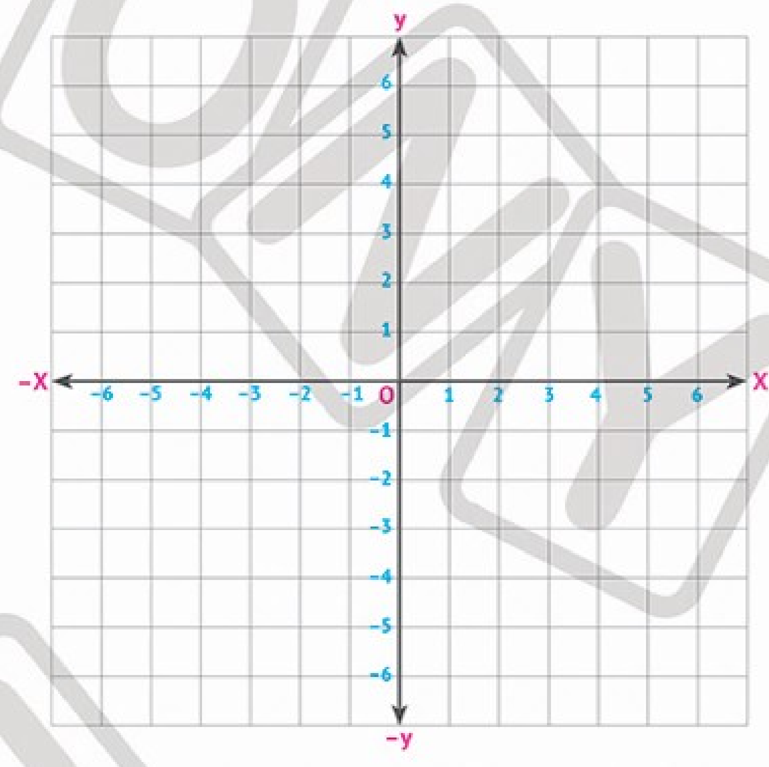


ⓒ The point (-4, -3) is a vertex of a rectangle with sides 2 units wide and 3 units long. Determine another 3 points to complete the rectangles.

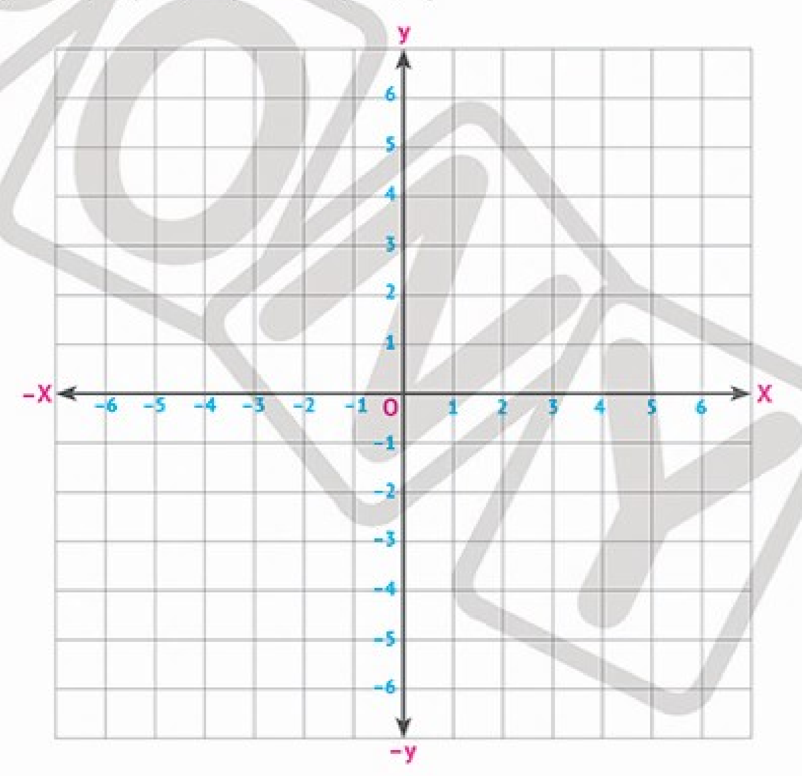


4 Answer the following:

ⓐ Using graph paper, plot the points (4 , − 6) , (4 , 1) and (3 , − 6) and connect them. Does this figure form a right angle? If yes, what are the coordinates of the vertex of the right angle?



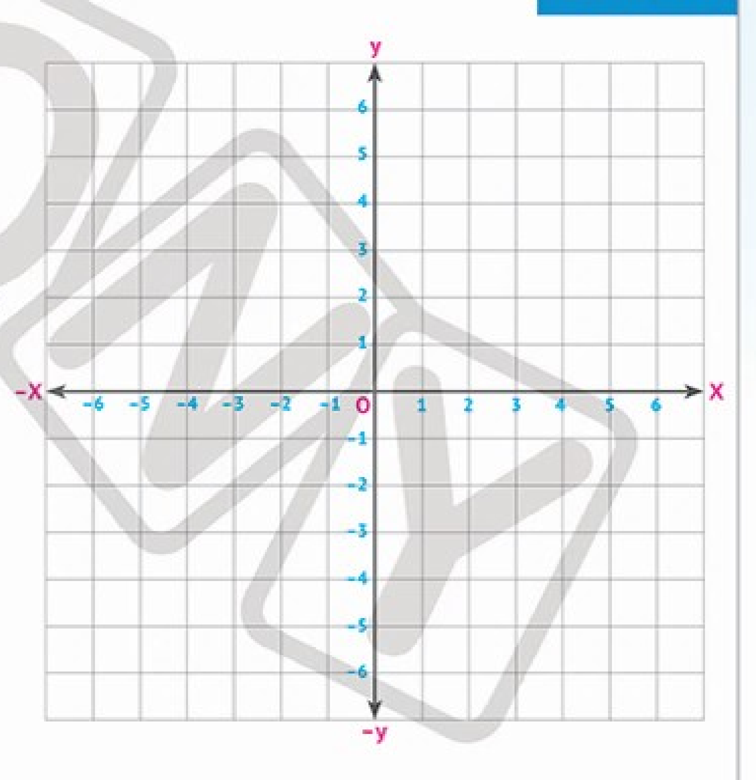
ⓑ What additional points should be included to make a rectangle using the points (1 ,0) ,(3 ,0) and (3 , 3)



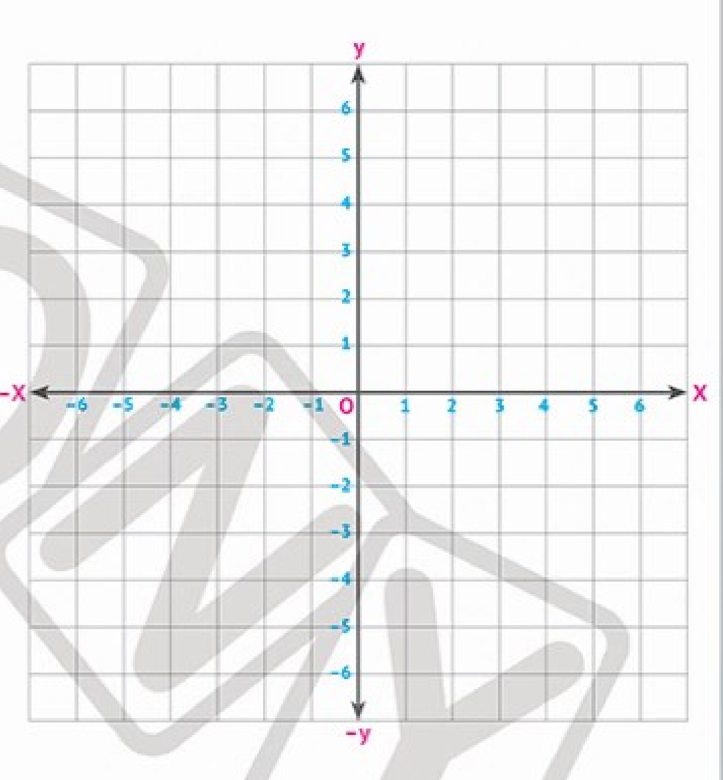
Assessment on Lesson 6

Unit 11

1 Using the graph paper, plot the points T (5 , 4) , U (- 4 , 4) and V (- 4 , - 5) then determine the fourth point to create a square



2 Ahmed has drawn a shape with the coordinate points (3 , -3), (-1 , -3), and (-1 , 6). Is the shape an acute-angle triangle?



Assessment 1 on



First: **Choose the correct answer:**

1. Which of the following lies on the 2^{nd} quadrant?

   ((-4 , 3) or (0 , −7) or (1 , 9) or (7 , 0))

2. If the point (x , - 3) lies in the 3^{rd} quadrant, then the value of x is ....

   (2 or 7 or −3 or 5)

3. The image of point (2 , -9) by reflection on x-axis is ....

   ((2 , 9) or (−9 , 2) or (−2 , −9) , (-2 , 9))

4. Which point of the following can be vertex of right angled – triangle If another vertices are (0 , 8) and (4 , 0)? ((0 , 1) or (0 , −1) or (0 , 0) or (1 , 1))

5. The point .... lies on the x-axis. ((6 , -7) or (0 , -2) or (-3 , 0) , (4 , 2))

Second: **Complete:**

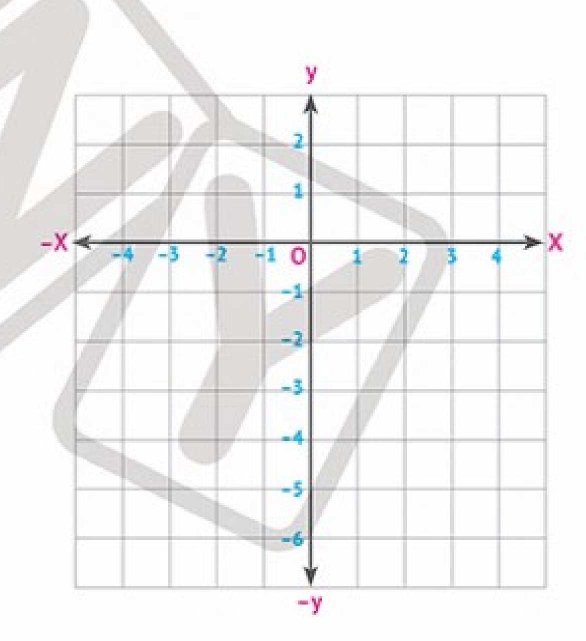
1. The distance between A (− 4 , 5) and y-axis is .... units.

2. The image of point (7 , −2) by reflection on .... is (−7 , −2).

3. If the point (6 , 2) moved 2 units in the negative direction of x-axis, it becomes ....

Third: **Using graph paper:**

Plot the point (0 , -2) as a vertex of square 4 unit length. Determine another 3 points to complete the square.



Assessment 2 on





Unit 11

First: **Choose the correct answer:**

1. Point C (5 , −3) lies in the .... quadrant.
   (first or second or third or fourth)
2. The distance between the two points (−5 , 6) and (−5 , 2) = ... units length.
   (−5 or 4 or 8 or 0)
3. The distance between -6 and 5 on the number line is .... units.
   (1 or −1 or 11 or 5)
4. The two points (3 , −7) and (-6 , −7) lie on the same ....
   (horizontal line or vertical line or incline line or otherwise)

Second: **Complete:**

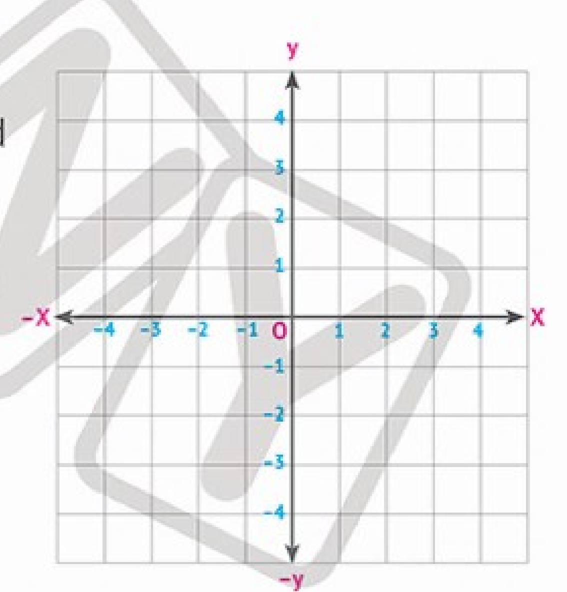
1. The coordinate plane is separated into .... quadrants.
2. The image of the point ($1\frac{1}{2}$, −3) on x-axis is ....
3. The distance between the point (3 , −5) and y-axis is .... units.
4. The point (−3 , − 5) lies on the .... quadrant.

Third: **Using graph paper:**

Plot the points (-3 , 3) , (3 , -1), and (-3 , -1) and connect them. Does this figure form a right angle? If yes, what are the coordinates of the vertex of the right angle?

....

....



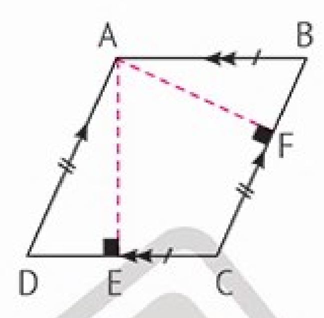
Unit 12 Area of Some Polygons

Concept 12.1 Find Area of Parallelogram, Triangle, and Trapezium

Lesson 1

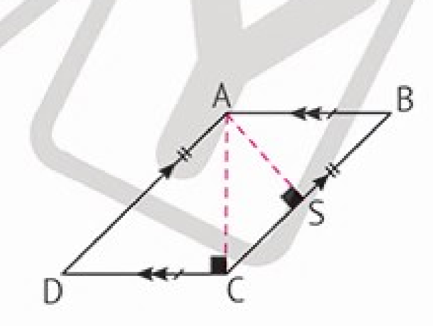
1 **Determine each base and corresponding height in each parallelogram:**

ⓐ



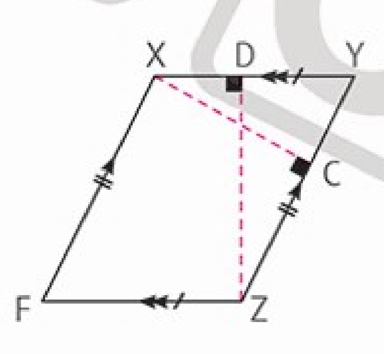
Base	$\overline{AB}$	$\overline{BC}$	$\overline{CD}$	$\overline{AD}$
Height	....	....	....	....

ⓑ



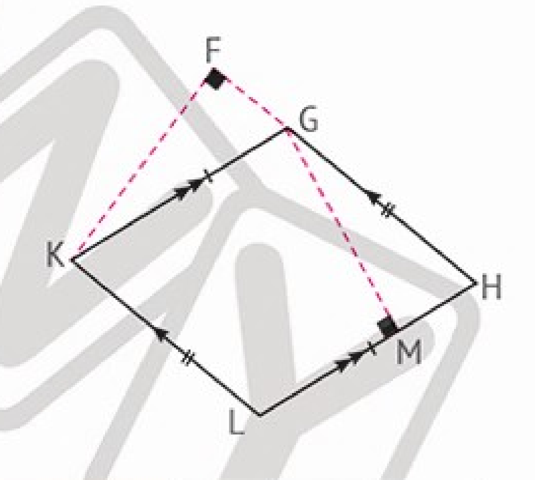
Base	$\overline{AB}$	....	$\overline{BC}$	....
Height	....	$\overline{AC}$	....	$\overline{AS}$

ⓒ



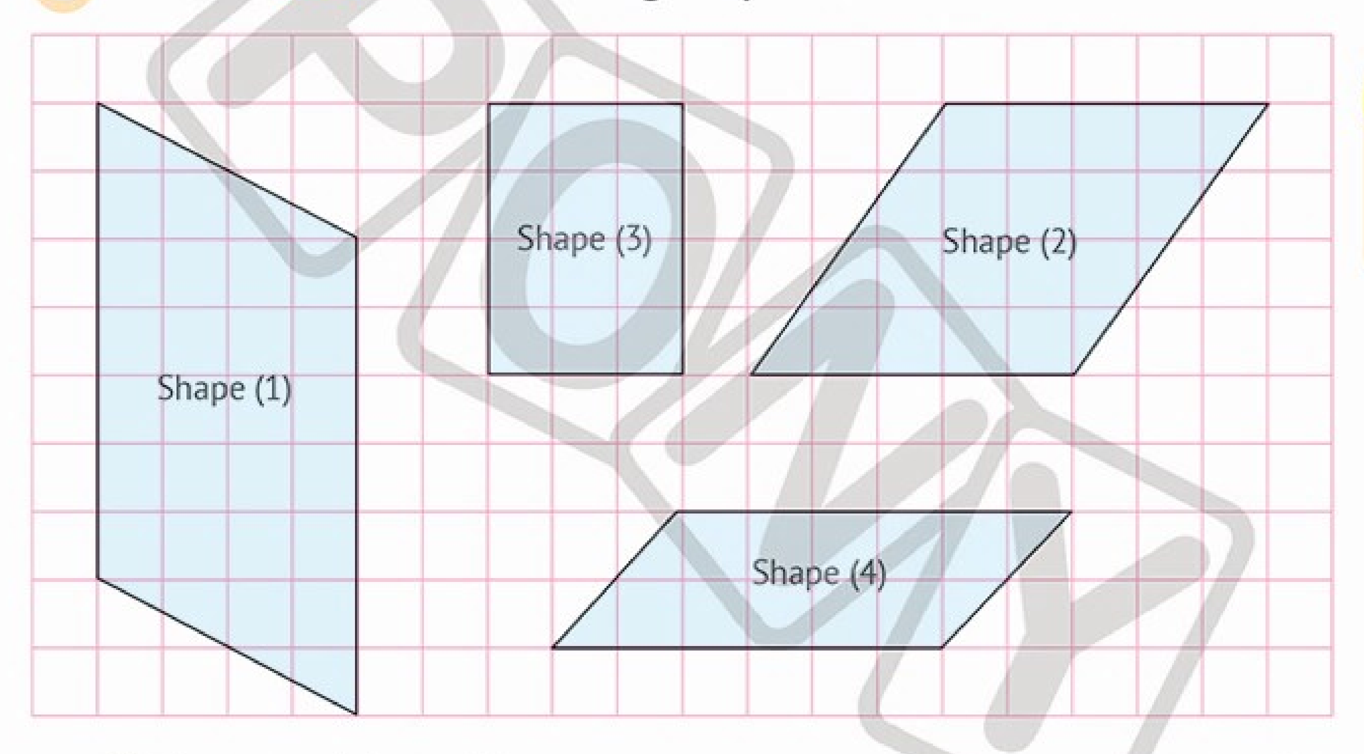
Base	$\overline{XY}$	$\overline{YZ}$	$\overline{ZF}$	$\overline{FX}$
Height	....	....	....	....

ⓓ



Base	$\overline{GH}$	$\overline{HL}$	$\overline{LK}$	$\overline{GK}$
Height	....	....	....	....

2 Find the area of the following shapes:



ⓐ The area of shape (1) = ... = ... square units.

ⓑ The area of shape (2) = ... = ... square units.

ⓒ The area of shape (3) = ... = ... square units.

ⓓ The area of shape (4) = ... = ... square units.

3 Choose the correct answer:

ⓐ A parallelogram in which all sides are equal in length is called a ....

(square or rectangle or rhombus or trapezium)

ⓑ A parallelogram that has a right angle is called a ....

(square or rectangle or rhombus or trapezium)

ⓒ A parallelogram in which all sides are equal in length and have right angles is called a ....(square or rectangle or rhombus or trapezium)

ⓓ If a parallelogram has the dimensions AB = 4 cm and BC = 6 cm, then the length of the corresponding height of AB ☐ the length of the corresponding height of BC.

(> or < or = or otherwise)

e) If the area of a parallelogram is 18 cm^2 and its base is 3 cm, then its corresponding height is .... cm. (54 or 6 or 9 or 36)

f) If the base length of a parallelogram is 8 cm and its corresponding height is 4 cm, then the area is .... cm^2. (2 or 12 or 32 or 16)

4 Complete the following:

a) The area of the square = ... x ....

b) If the area of a parallelogram is 80 cm^2 and its base is 10 cm, then its corresponding height is .... cm.

c) The area of a parallelogram whose base length is 8 cm and its height is 6 cm is .... cm^2.

d) The area of the rhombus = ... X ....

e) If the area of a parallelogram is 36 cm^2, and its height is 9 cm, then its corresponding base is .... cm.

f) If a square has a side length of 6 cm, then its area is .... cm^2.

g) If a rhombus has a side length of 7 cm and its corresponding height is 4 cm, then its area is .... cm^2.

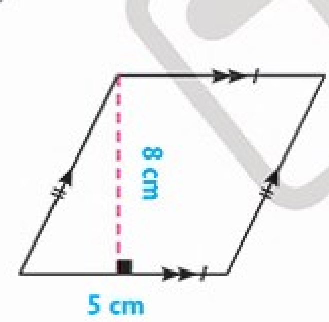
h) If the area of a square is 144 cm^2, then its side length is .... cm.

i) The longer height corresponds to the .... side.

j) The longer side corresponds to the .... height.

5 Find the **area** of the following shapes:

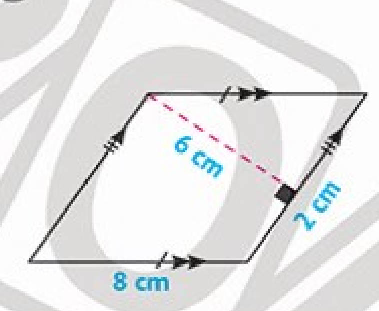
(a)



Area = ...

....

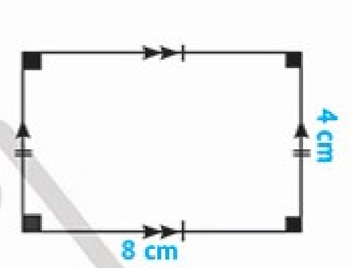
(b)



Area = ...

....

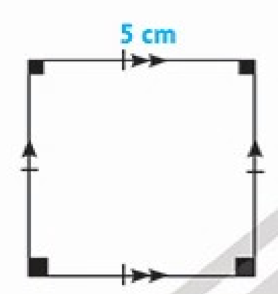
(c)



Area = ...

....

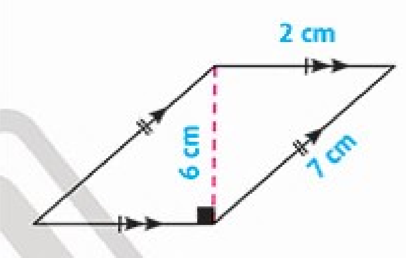
(d)



Area = ...

....

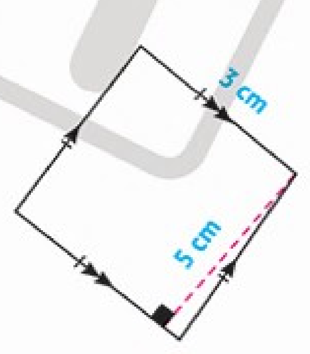
(e)



Area = ...

....

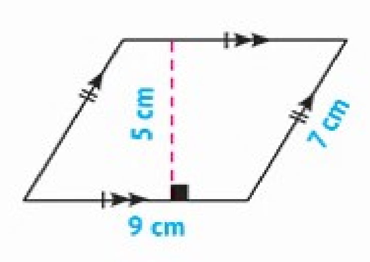
(f)



Area = ...

....

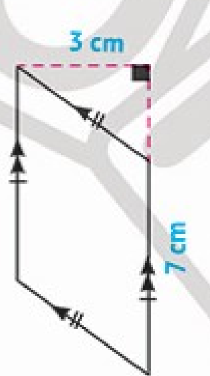
(g)



Area = ...

....

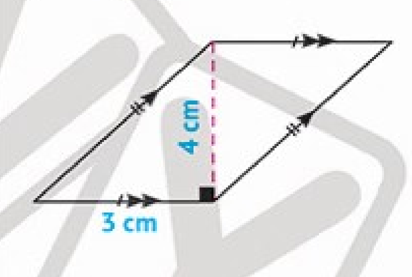
(h)



Area = ...

....

(i)



Area = ...

....

6 Answer the following:

ⓐ If a parallelogram has a base length of 6 cm and its corresponding height is 7 cm, find its area.

....

....

ⓑ If a parallelogram has an area of 84 cm^2 and its base length is 12 cm, calculate its corresponding height.

....

....

ⓒ ABCD is a parallelogram. If AB = 8 cm and BC = 5 cm and the corresponding height to AB is 4 cm, find the height corresponding to BC.

....

....

ⓓ Which is greater in area...?

A square whose side length is 6 cm, or rectangle with dimensions 9 cm and 3 cm.

....

....

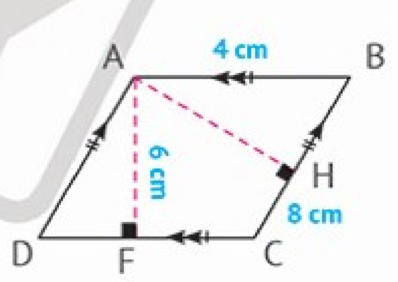
ⓔ According to the following shape, find:

The length of AH.

....

....

....



Assessment on Lesson 1

Unit 12

1 Choose the correct answer:

ⓐ A parallelogram which has a right angle is called a ....

(square or rectangle or rhombus or trapezium)

ⓑ If the area of a parallelogram is 36 cm^2 and its base is 4 cm, then its corresponding height is .... cm. (54 or 6 or 9 or 18)

ⓒ If the dimensions of a parallelogram is AB = 9 cm and BC = 4 cm, then the length of the corresponding height of AB ☐ the length of the corresponding height of BC. (> or < or = or otherwise)

ⓓ If the base length of a parallelogram is 12 cm and its corresponding height is 4 cm, then its area is .... cm^2. (3 or 8 or 36 or 48)

2 Complete the following:

ⓐ The area of the rectangle = ... x ....

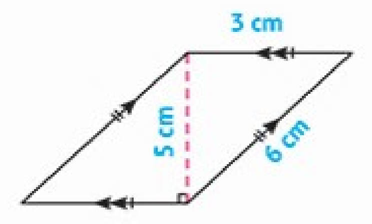
ⓑ If a rhombus has a side length of 6 cm and its corresponding height is 3 cm, then its area is .... cm^2.

ⓒ In the parallelogram, the longer height corresponds to the .... side.

ⓓ If the area of a parallelogram is 80 cm^2 and its base is 10 cm, then its corresponding height is .... cm.

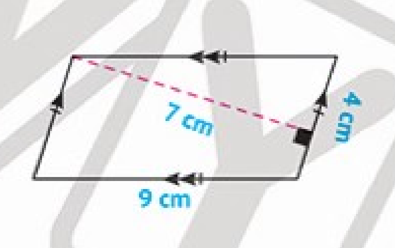
3 Find:

ⓐ



The area = ... cm^2.

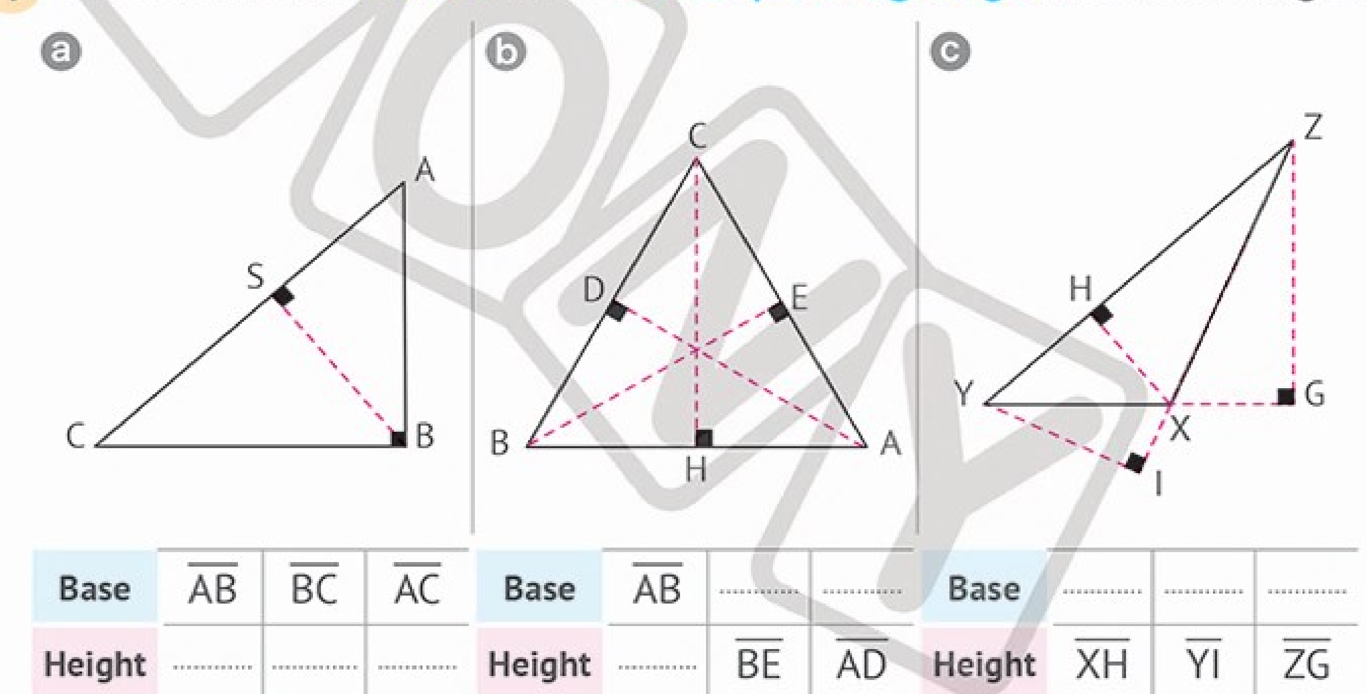
ⓑ



The area = ... cm^2.

Lessons 2&3

1 Determine each base and its corresponding height in each triangle:

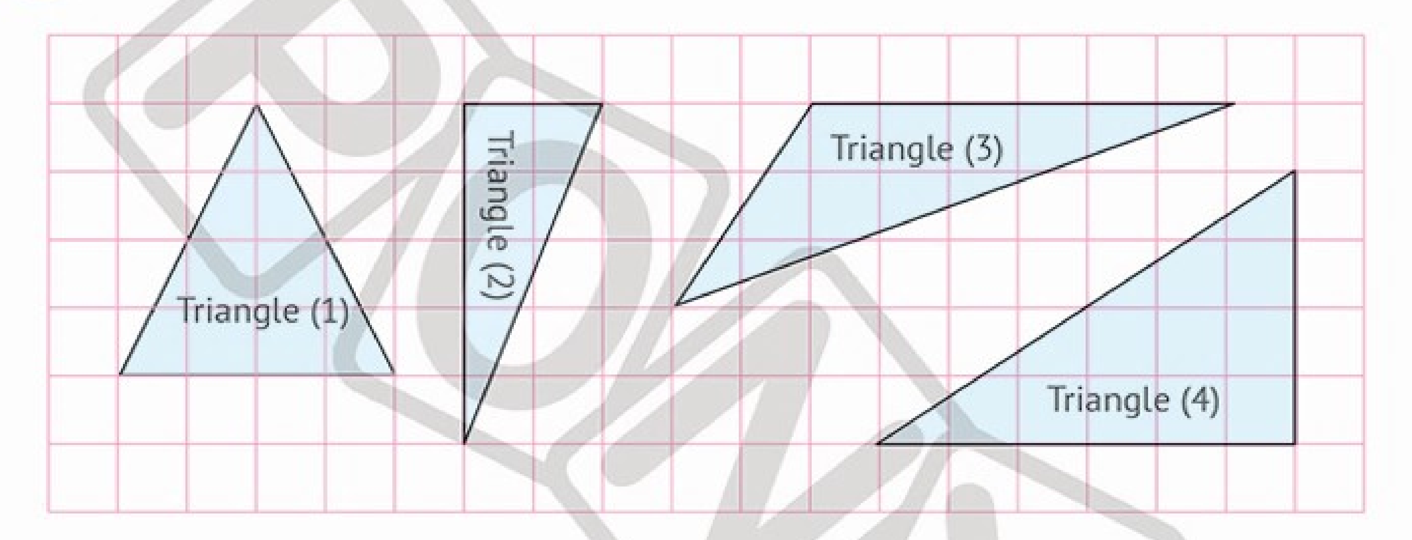


Base	$\overline{AB}$	$\overline{BC}$	$\overline{AC}$
Height	....	....	....

Base	$\overline{AB}$	....	....
Height	....	$\overline{BE}$	$\overline{AD}$

Base	....	....	....
Height	$\overline{XH}$	$\overline{YI}$	$\overline{ZG}$

2 Find the area of each triangle:



a) The area of triangle (1) = ... = ... square units.

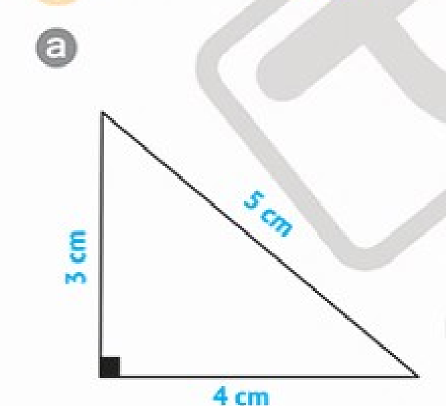
b) The area of triangle (2) = ... = ... square units.

c) The area of triangle (3) = ... = ... square units.

d) The area of triangle (4) = ... = ... square units.

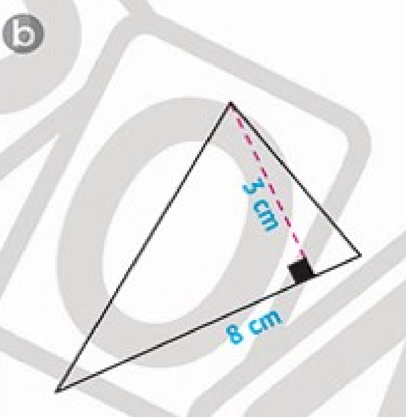
3 Find the area of the following triangles:

ⓐ



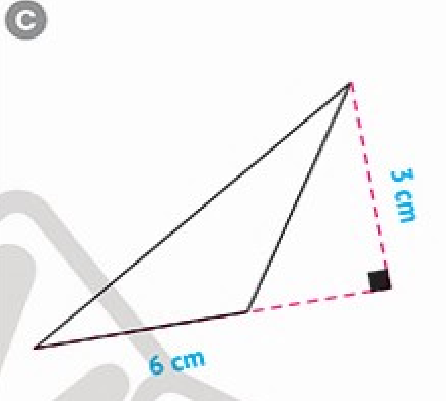
Area = ...

ⓑ



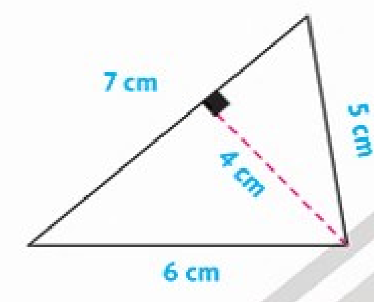
Area = ...

ⓒ



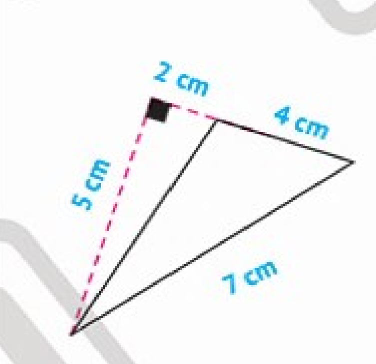
Area = ...

ⓓ



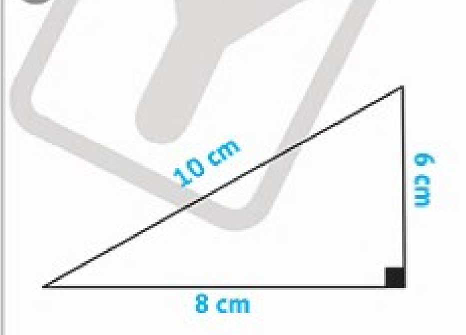
Area = ...

ⓔ



Area = ...

ⓕ



Area = ...



4 Choose the correct answer:

ⓐ The number of heights of any triangle is .... (0 or 1 or 2 or 3)

ⓑ If a triangle has a base length of 6 cm and its corresponding height is 5 cm, then its area is .... cm^2. (30 or 15 or 45 or 60)

ⓒ The number of heights of a right triangle is .... (0 or 1 or 2 or 3)

ⓓ If the area of a triangle is 30 cm^2 and its base is 6 cm, then its height is .... cm. (5 or 2.5 or 10 or 90)

ⓔ The area of the triangle = ... ($\frac{1}{2}$ b X h or b X h or W X L or $\frac{1}{4}$ b x h)

ⓕ If the perimeter of an equilateral triangle is 18 cm and its area is 15 cm^2, then its height is .... cm. (5 or 15 or 30 or 6)

5 Complete the following:

a. If a triangle has a base length of 9 cm and its corresponding base is 4 cm, then its area is .... cm^2.

b. The number of heights of an equilateral triangle is ....

c. In an obtuse triangle, if its base length is 12 cm and its corresponding height is 5 cm, then its area is .... cm^2.

d. If the area of a triangle is 20 cm^2 and its base length is 8 cm, then the length of its corresponding height is .... cm.

e. The area of a right triangle = ... x .... x ....

f. The line segment drawn from a vertex of a triangle and perpendicular to a corresponding side is called a ....

6 Answer the following:

a. If a triangle has a base length of 20 cm and its corresponding height is 7 cm, find its area.

....

b. If a triangle has a base length of 1.2 dm and its corresponding height is 5 cm, calculate the area of the triangle in cm.

....

c. A triangle has an area of 45 cm^2, and its base is 9 cm.
Find the corresponding height.

....

d. Which is greater in area...?
A triangle whose base length is 1.5 dm and whose corresponding height is 6 cm, or a triangle whose base length is 8 cm and whose corresponding height is 7 cm.

....

....

Assessment on Lessons 2&3

Unit 12

1 Choose the correct answer:

a The number of heights of a right triangle is ....

(0 or 1 or 2 or 3)

b If a triangle has a base length of 8 cm and its corresponding height is 5 cm, then its area is .... cm^2. (30 or 15 or 40 or 20)

c If the area of a triangle is 35 cm^2 and its base length is 10 cm, then the length of its corresponding height is .... cm. (70 or 35 or 7 or 10)

d If a triangle has a base length of 20 cm and its corresponding height is 7.5 cm, then its area is .... cm^2. (150 or 75 or 32.5 or 750)

2 Complete the following:

a The area of the triangle = ...

b The perpendicular line segment drawn from the vertex of a triangle to the opposite side is called a ....

c If an acute triangle has a base length of 7 cm and its corresponding height is 4 cm, then its area is .... cm^2.

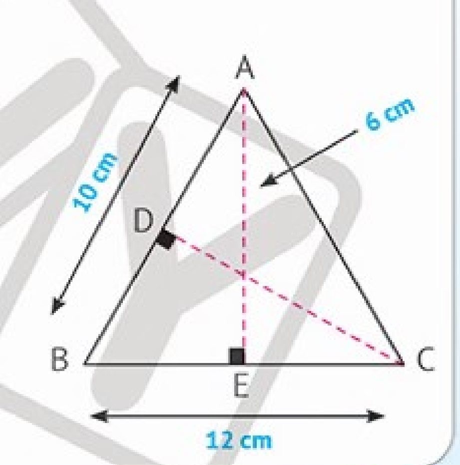
d The number of heights of a scalene triangle is ....

3 According to the opposite triangle, find the length of CD.

....

....

....



Lesson 4

1 Find the **area** of the following trapeziums using **composition**:

ⓐ
- Area of the rectangle



= .... units^2.

- Area of triangle (1)

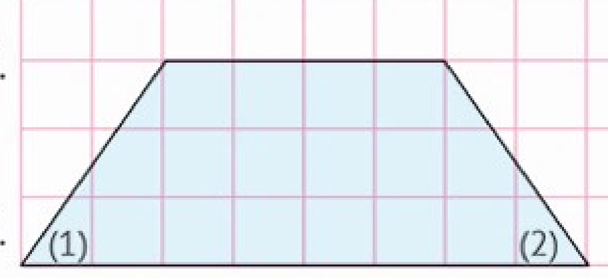
= .... units^2.

- Area of triangle (2)

= .... units^2.

- Area of the trapezium = ... units^2.

ⓑ
- Area of the rectangle



= .... units^2.

- Area of triangle (1)

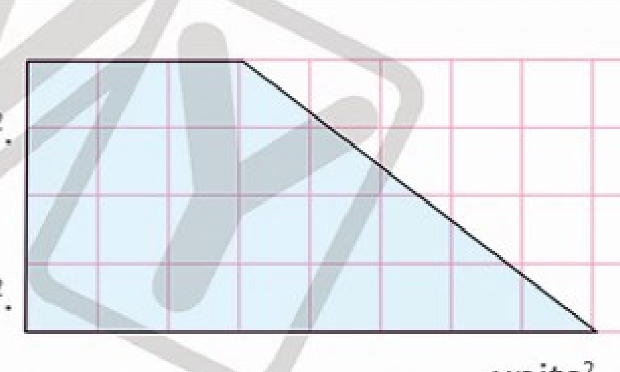
= .... units^2.

- Area of triangle (2)

= .... units^2.

- Area of the trapezium = ... units^2.

ⓒ
- Area of the rectangle



= .... units^2.

- Area of the triangle

= .... units^2.

- Area of the trapezium = ... units^2.

2 **Find the area of the following trapeziums using decomposition:**

ⓐ • Area of the rectangle

= .... units².

• Area of triangle (1)

= .... units².

• Area of triangle (2)

= .... units².

• Area of the trapezium = ... units².



ⓑ • Area of the rectangle

= .... units².

• Area of the triangle

= .... units².

• Area of the trapezium

= .... units².



ⓒ • Area of the rectangle

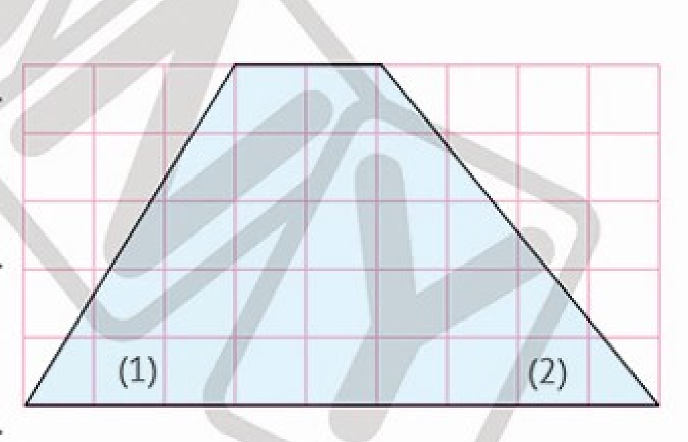
= .... units².

• Area of triangle (1)

= .... units².

• Area of triangle (2)

= .... units².

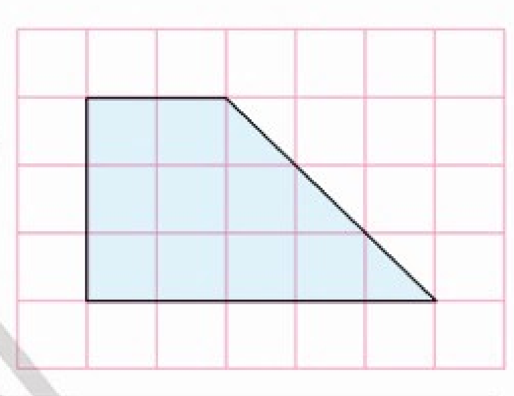


• Area of the trapezium = ... units².

Theme 4

3 Choose the correct answer:

ⓐ Which of the following can be used to calculate the area of the opposite trapezium?



($(2 \times 3) + (3 \times 3)$ or $(2 + 3) + [\frac{1}{2} (3 \times 3)]$ or $(2 \times 3) - [\frac{1}{2}(3 \times 3)]$ or $(2 \times 3) + [\frac{1}{2} (3 \times 3)]$)

ⓑ The area of the opposite figure is .... square units.



(30 or 28 or 26 or 25)

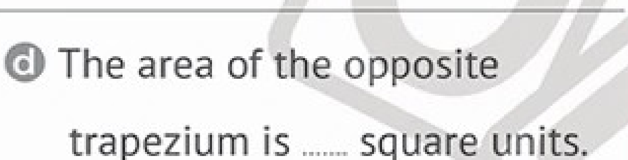
ⓒ Which of the following can be used to calculate the area of the opposite trapezium?

($(1 \times 4) + (4 \times 1) + (4 \times 1)$ or

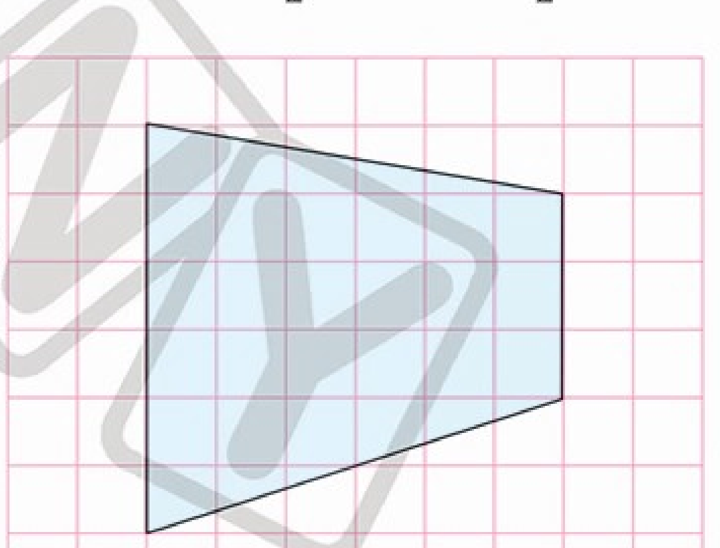
$(4 \times 1) + [\frac{1}{2} (4 \times 1)] + [\frac{1}{2} (4 \times 1)]$ or



$(1 + 4) - [\frac{1}{2} (4 \times 1)] - [\frac{1}{2} (4 \times 1)]$ or $(1 \times 4) - [\frac{1}{2} (4 \times 1)] - [\frac{1}{2} (4 \times 1)$)



ⓓ The area of the opposite trapezium is .... square units.



(18 or 28 or 27 or 9)

ⓔ A trapezium has exactly .... pair(s) of parallel sides.

(0 or 1 or 2 or 3)

Assessment on Lesson 4

Unit 12

Find the **area** of the following trapeziums:

a
- Area of the rectangle
  = ... units^2.
- Area of the triangle
  = ... units^2.
- Area of the trapezium
  = ... units^2.

b
- Area of the rectangle
  = ... units^2.
- Area of triangle (1)
  = ... units^2.
- Area of triangle (2)
  = ... units^2.
- Area of the trapezium = ... units^2.

c
- Area of the rectangle
  = ... units^2.
- Area of triangle (1)
  = ... units^2.
- Area of triangle (2)
  = ... units^2.
- Area of the trapezium = ... units^2.

d
- Area of the rectangle
  = ... units^2.
- Area of triangle (1)
  = ... units^2.
- Area of triangle (2)
  = ... units^2.
- Area of the trapezium = ... units^2.

Assessment 1 on



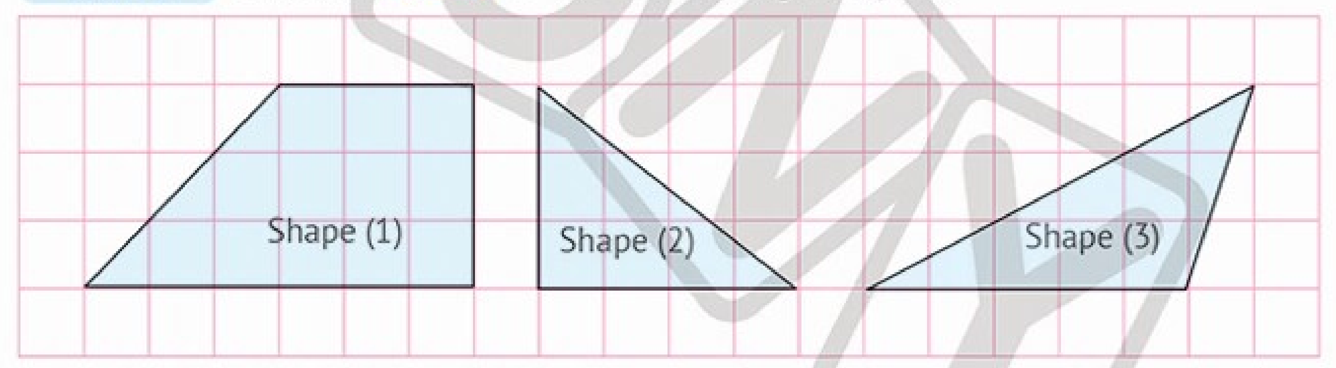
First: **Choose the correct answer:**

1. The number of heights of the right triangle is .... (0 or 1 or 2 or 3)
2. If a parallelogram has dimensions AB = 9 cm and BC = 13 cm, then the length of the corresponding height of AB ☐ the length of the corresponding height of BC. (> or < or = or otherwise)
3. A parallelogram in which all sides are equal in length is called a .... (square or rectangle or rhombus or trapezium)
4. If the area of a triangle is 15 cm^2 and its base is 6 cm, then the height is .... cm. (5.5 or 5 or 6 or 90)

Second: **Complete the following:**

1. In an obtuse triangle, if its base length is 10 cm and its corresponding height is 7 cm, then its area is .... cm^2.
2. In the parallelogram, the longer height corresponds to .... sides.
3. The trapezium has exactly .... pair(s) of parallel sides.
4. The area of the rhombus equals ....

Third: **Find the area of the following shapes:**



1. The area of shape (1) = ... square units.
2. The area of shape (2) = ... square units.
3. The area of shape (3) = ... square units.

Assessment 2 on Unit 12



First: **Choose the correct answer:**

1. A parallelogram in which all sides are equal in length and have right angles is called a ....
   (square or rectangle or rhombus or trapezium)
2. If the base length of a parallelogram is 8 cm and its corresponding height is 4 cm, then its area is .... cm^2. (2 or 12 or 32 or 16)
3. If the area of a triangle is 12 cm^2 and its base is 4 cm, then its height is .... cm. (5 or 6 or 10 or 48)
4. The number of heights of any triangle is .... (0 or 1 or 2 or 3)

Second: **Complete the following:**

1. In an acute triangle, if its base length is 13 cm and its corresponding height is 6 cm, then its area is .... cm^2.
2. A parallelogram in which all sides are equal in length is called a ....
3. If the area of a triangle is 35 cm^2 and its base is 7 cm, then its height is .... cm.
4. The area of the rectangle = ... X ....

Third: **According to the opposite triangle, find the length of CD.**

....

....

....

....

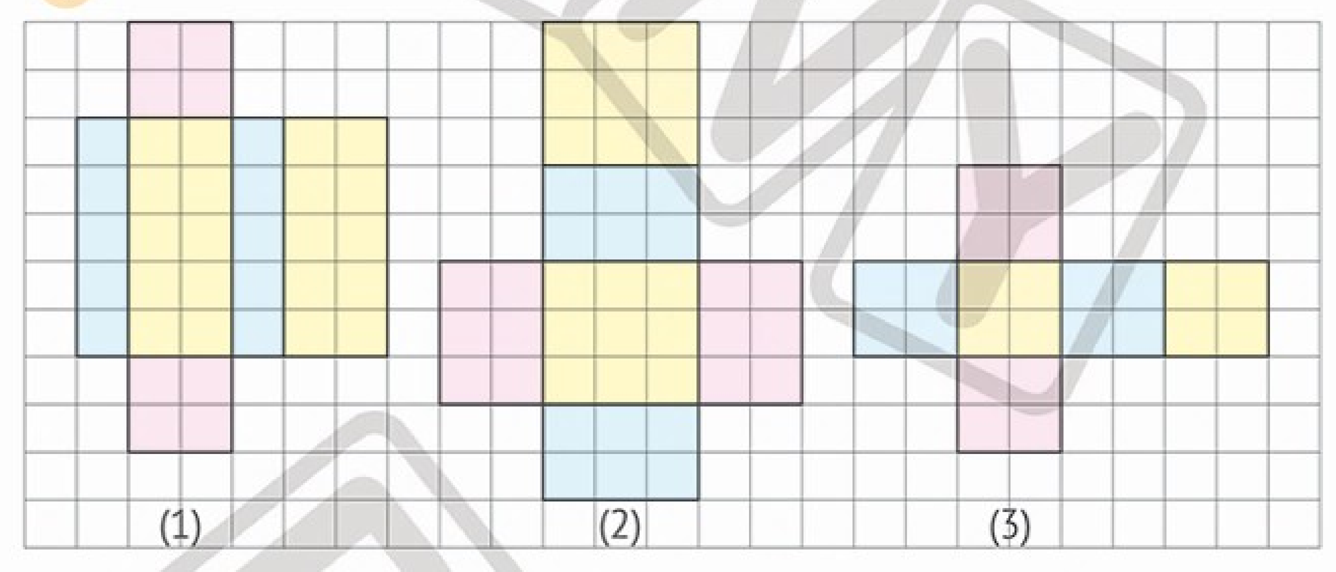
....

Unit 13 Surface Area and Volume

Concept 13.1 Use Nets to Find Surface Area

Lesson 1

1 Find the surface area of the following:



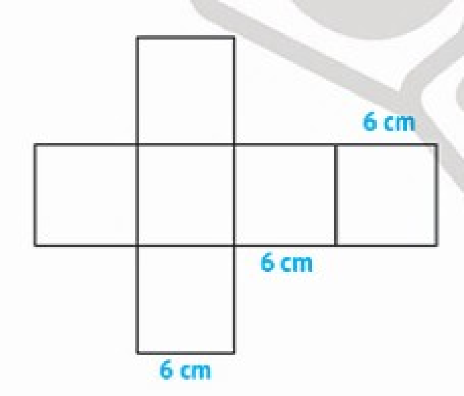
ⓐ The surface area of shape (1) = ... cm^2.

ⓑ The surface area of shape (2) = ... cm^2.

ⓒ The surface area of shape (3) = ... cm^2.

2 After folding the following shapes, find:

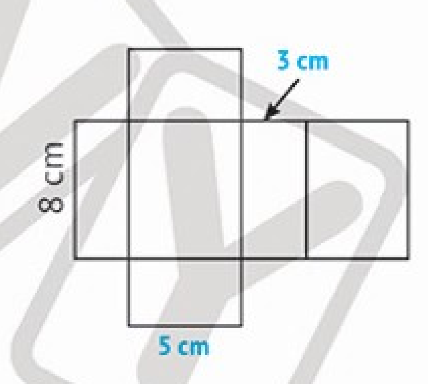
ⓐ



The name of solid: ....

The surface area = ... cm^2.

ⓑ

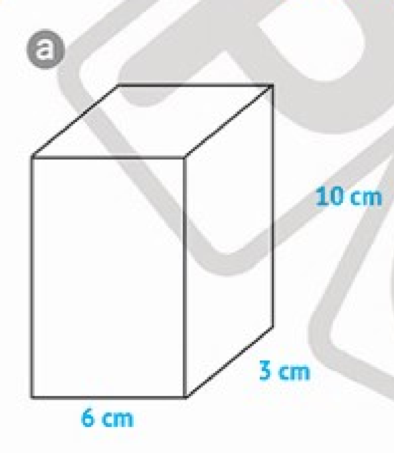


The name of solid: ....

The surface area = ... cm^2.

3 Calculate the surface area of the following solids:

a



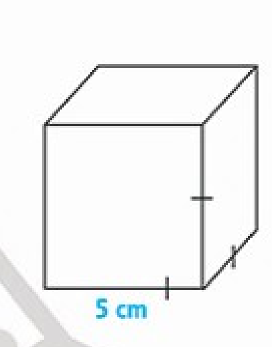
The surface area = ... cm^2 .

b

4 cm
2 cm
9 cm

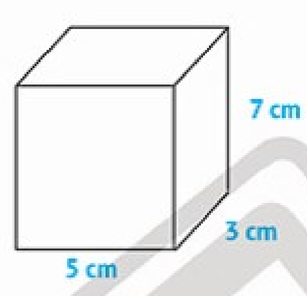
The surface area = ... cm^2 .

c



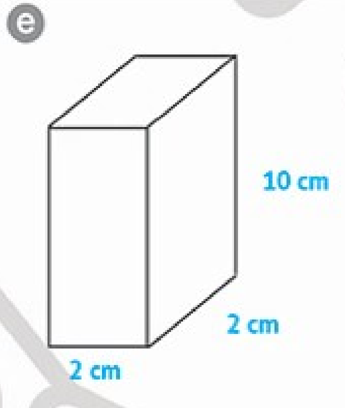
The surface area = ... cm^2 .

d



The surface area = ... cm^2 .

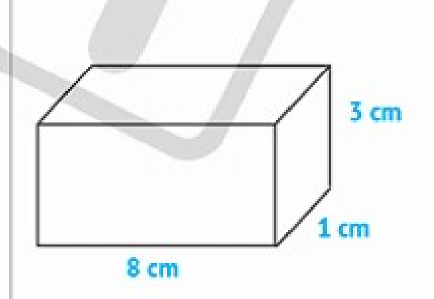
e





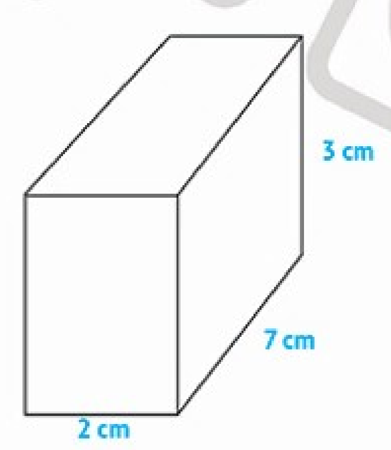
The surface area = ... cm^2 .

f



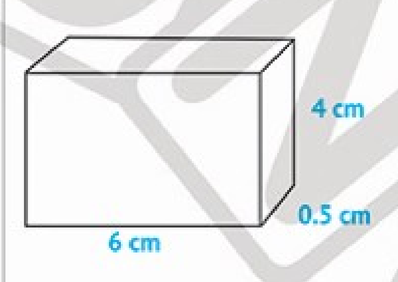
The surface area = ... cm^2 .

g



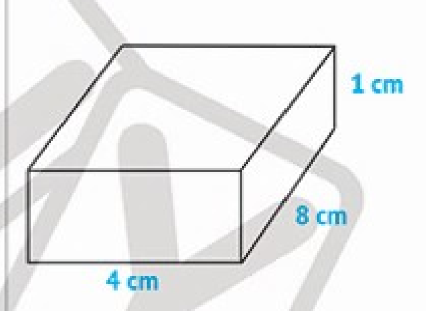
The surface area = ... cm^2 .

h



The surface area = ... cm^2 .

i



The surface area = ... cm^2 .

4 Complete:

a) The surface area of a cube = ...

b) The surface area of a cuboid = ...

c) The ratio of the area of one face of a cube to its surface area is .... : ....

d) The surface area of a cuboid of dimensions 3 cm, 5 cm, and 2 cm is .... cm^2.

e) A cube with a 6 cm edge has a surface area of .... cm^2.

f) If the surface area of a cube is 84 cm^2. Then the area of one face equals .... cm^2.

5 Choose the correct answer:

a) A cube with surface area of 54 cm^2. Then the edge length is .... cm.

(9 or 3 or 27 or 6)

b) The surface area of a cuboid whose dimension are 6 cm, 4 cm, and 1 cm equals .... cm^2. (24 or 68 or 30 or 10)

c) If the sum of edges of a cube is 36 cm, then the area of one face is .... cm^2. (6 or 18 or 72 or 9)

d) A cuboid with dimensions of 0.7 dm, 5 cm, and 3 cm, then its surface area = ... cm^2. (35 or 15 or 142 or 41.2)

e) The surface area of a cuboid with dimensions of 2 cm , 5 cm, and 10 cm is .... cm^2.

(2 X 17 or 2 X 5 X 10 or 2 X (10 + 50 + 20) or 4 + 10 + 20)

f) The formula of area of one face of a cube is ....

($6 s^2$ or $4 s^2$ or $6 s$ or s^2)

6 Answer the following:

ⓐ A rectangular prism with dimensions of 7 cm, 5 cm, and 3 cm. Find the surface area. ....

....

ⓑ A tank in a shape of cube, its edge length is 10 cm. Find:

1 The area of one face. 2 The surface area.

....

....

ⓒ Study the opposite figure, then find the surface area:

....

....

6 cm
3 cm
5 cm

ⓓ Farida wants to paint a box yellow. The dimensions of her box are 50 cm, 20 cm, and 40 cm. Calculate the surface area of her box.

....

....

ⓔ Which is greater in surface area? A cube of edge length is 8 cm, or a cuboid with dimensions of 10 cm , 5 cm and 1 cm.

....

....

ⓕ A factory produces a box of metal, its dimensions are 1m , 1.2m, and 2 m. Find:

1 The surface area of that box. 2 The surface area of 10 boxes.

....

....

Assessment on Lesson 1

Unit 13

1 Choose the correct answer:

ⓐ The ratio between the surface area of a cube and the area of one face is .... (1 : 4 or 1 : 6 or 4 : 1 or 6 : 1)

ⓑ A cuboid has a height of 5 cm, a length of 7 cm, and a width of 1 cm. Then the surface area is .... (47 or 35 or 94 or 42)

ⓒ A cube of side length 30 cm, then the area of one face is .... cm^2. (0.9 or 9 or 90 or 900)

ⓓ A cube with a surface area of 150 cm^2. Then the edge length is .... cm. (9 or 5 or 25 or 6)

2 Complete:

ⓐ The area of a cuboid = ...

ⓑ The surface area of a cube with an edge length of 4 cm is .... cm^2.

ⓒ A cuboid with a height of 4 cm , a length of 10 cm, and a width of 2 cm. Then the surface area is ....

ⓓ The sum of edges of a cube is 48 cm, then its surface area is .... cm^2.

3 Answer the following:

- Which is greater in surface area?

A cube of edge length is 7 cm, or A cuboid with dimensions of 6 cm , 4 cm, and 1.2 dm.

....

....

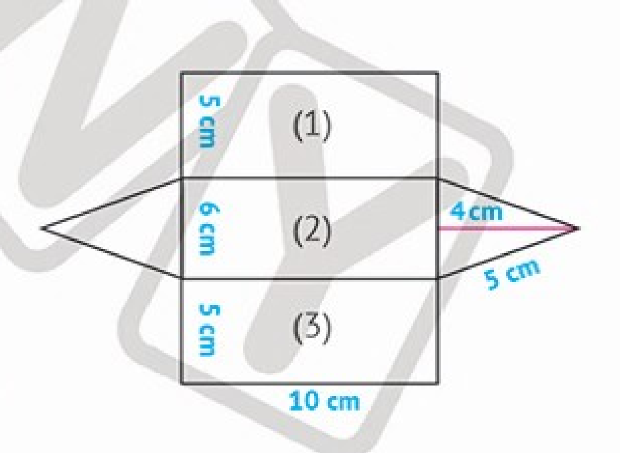
Lesson 2



1 Using the following shapes, complete the tables:

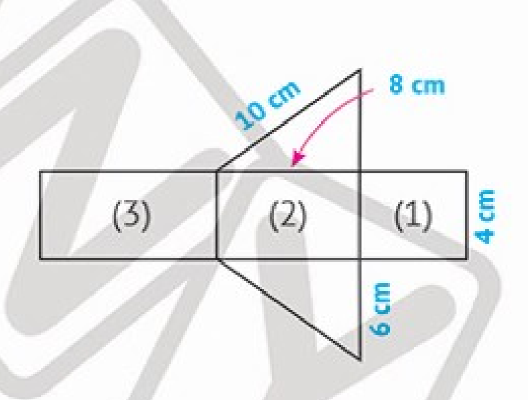
ⓐ

Face of Triangular Prism	Area
Area of (1)	
Area of (2)	
Area of (3)	
Area of top	
Area of bottom	
Surface Area	



ⓑ

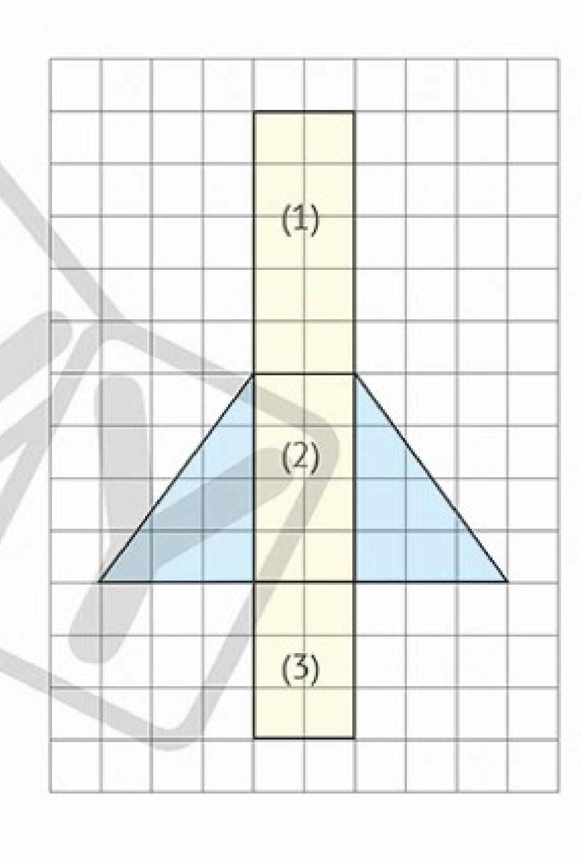
Face of Triangular Prism	Area
Area of (1)	
Area of (2)	
Area of (3)	
Area of the Top	
Area of the Bottom	
Surface Area	



2 **Study the shapes on the grid, then complete the following tables:**

a

Face of Triangular Prism	Area
Area of (1)	
Area of (2)	
Area of (3)	
Area of the Top	
Area of the Bottom	
Surface Area	

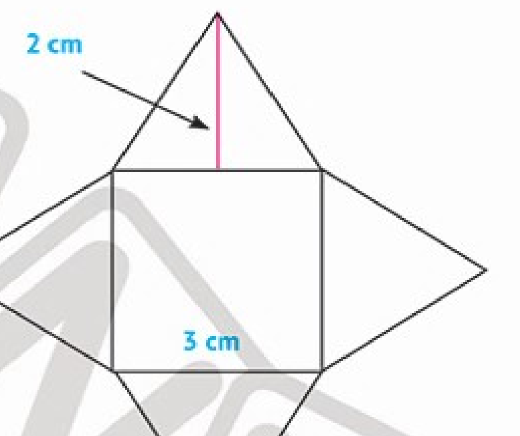


b

Face of Triangular Prism	Area
Area of (1)	
Area of (2)	
Area of (3)	
Area of the Top	
Area of the Bottom	
Surface Area	

(1)
(2)
(3)

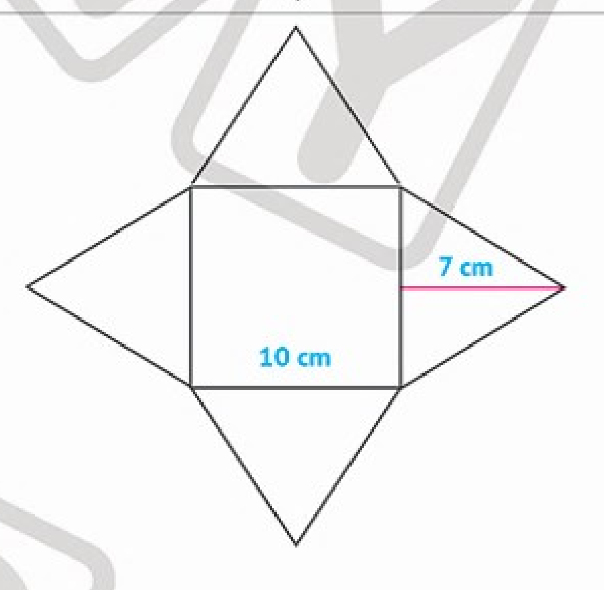
3 Find the surface area of the following square-based pyramids:



ⓐ Surface area =

....

....



ⓑ Surface area =

....

....

4 Find the surface area of the following square-based pyramids:

ⓐ Base area

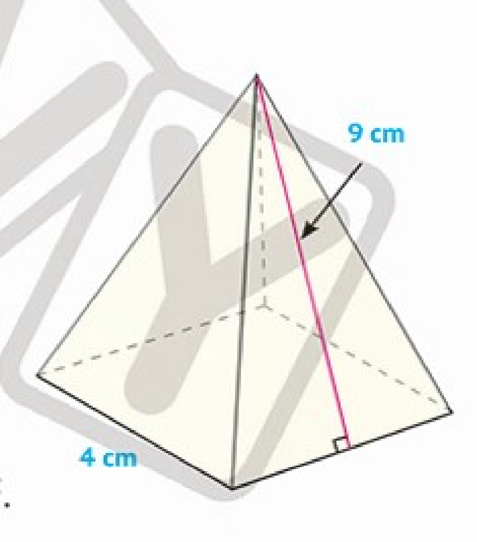
= .... = ... cm^2.

- The area of triangular face

= .... = ... cm^2.

- Surface area

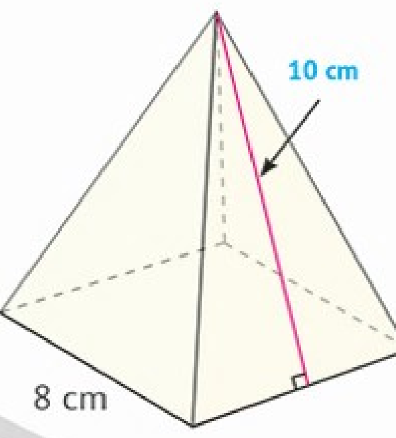
= .... + ... = ... cm^2.



ⓑ Base area



= .... = ... cm^2.



- The area of triangular face

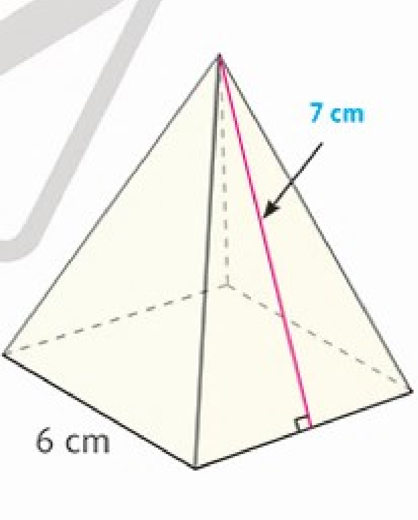
= .... = ... cm^2.

- Surface area

= .... + ... = ... cm^2.

ⓒ Base area

= .... = ... cm^2.



- The area of triangular face

= .... = ... cm^2.

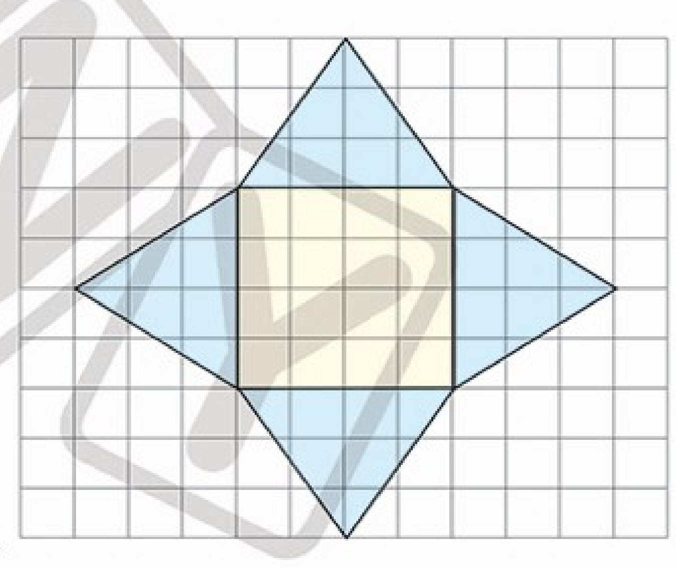
- Surface area

= .... + ... = ... cm^2.

5 Study the shapes on the grid, then complete the following tables:

ⓐ Base area =

= .... = ... cm^2.



- The area of triangular face

= .... = ... cm^2.

- Surface area

= .... + ... = ... cm^2.

ⓑ Base area

= .... = ... cm².

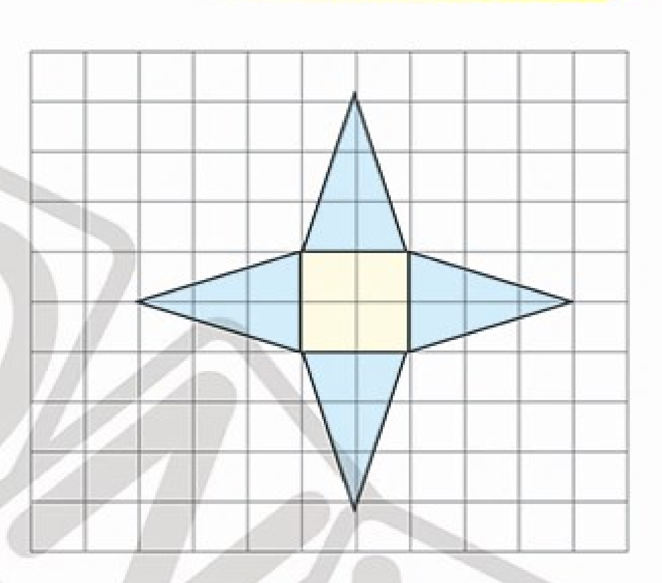


• The area of triangular face

= .... = ... cm².

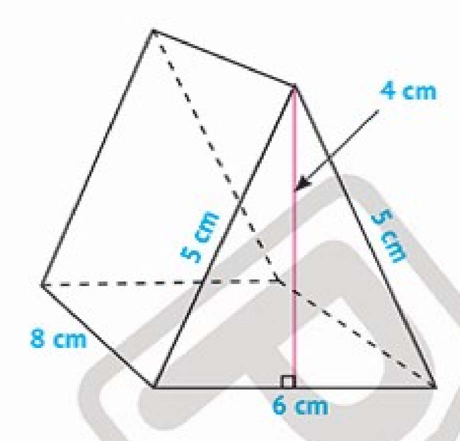
• Surface area

= .... + ... = ... cm².



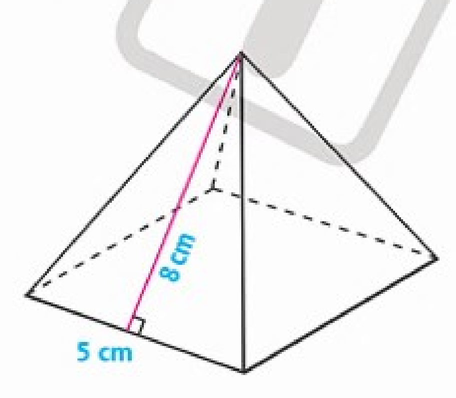
6 Find the **surface area** of the following solids:

ⓐ



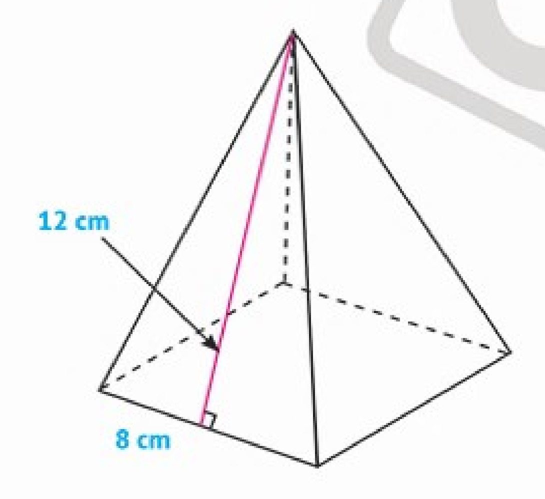
Surface area = ...

ⓑ



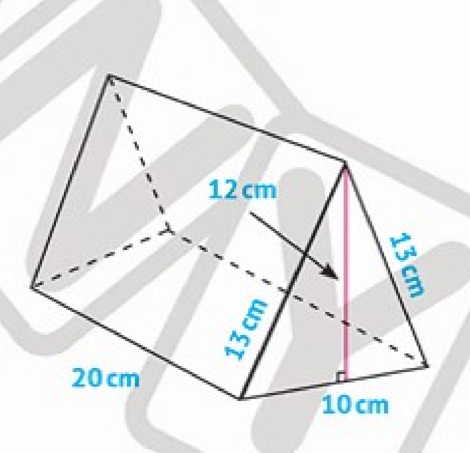
Surface area = ...

ⓒ



Surface area = ...

ⓓ

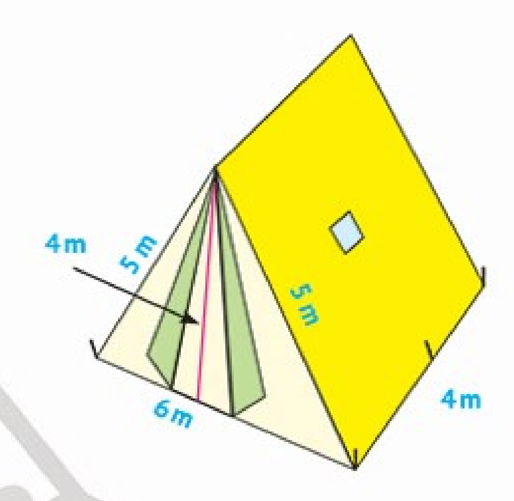


Surface area = ...

7 Answer the following:

ⓐ In the opposite figure:

A tent of cloth in the shape of a triangular prism. Calculate how many square meters of cloth are needed to make it.



....

....

....

ⓑ Murad made a square-based pyramid from wood. If the side of the square is 6 cm, and the height of the triangular faces is 9 cm, calculate the surface area of the box.

....

....

....

ⓒ A pyramid of metal. The square base has a side length of about 100 cm. The height of each triangular face is about 80 cm. What is the surface area of the pyramid?

....

....

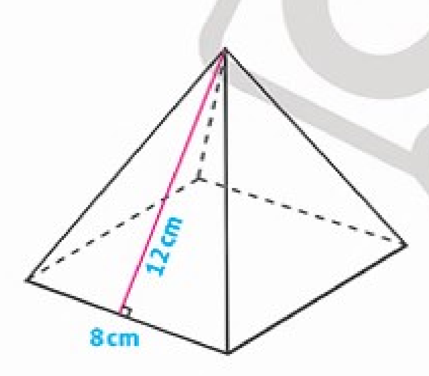
....

Assessment on Lesson 2

Unit 13

1 Find the **surface area** of the following:

ⓐ

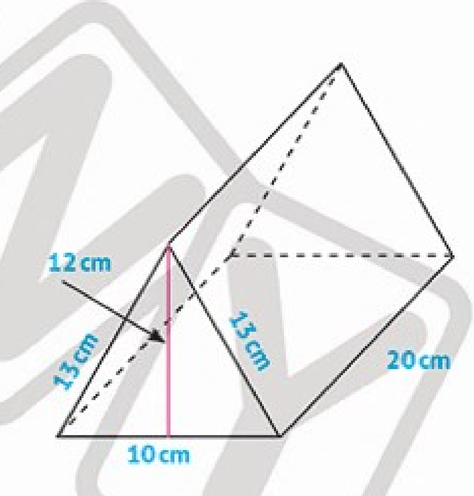


Surface area = ...

....

....

ⓑ



Surface area = ...

....

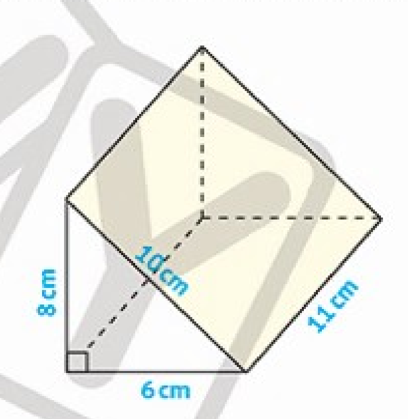
....

2 ⓐ There's a house with a roof in the shape of square-based pyramid. If its base side is 3 m and the height of the triangular side is 4m. Find its surface area.

....

....

ⓑ In the following figure, find the surface area.



....

....

....

Unit 13 Surface Area and Volume

Concept 13.2 Calculate Volume

Lessons 3&4

1 Complete the following:

ⓐ The volume of a cuboid = ... x .... x ....

ⓑ If the dimensions of a cuboid are 2 m, 5 m, and 3 m. Then its volume = ... m^3.

ⓒ A cuboid's of volume is 350 m^3. If we doubled two of its dimensions, then the volume of the new cuboid = ... m^3.

ⓓ The ratio of the volume of a cuboid to itself after doubling one of its dimensions is .... : ....

ⓔ 12 cm, 10 cm, and 4 cm are dimensions of a cuboid, then its volume = ... cm^3

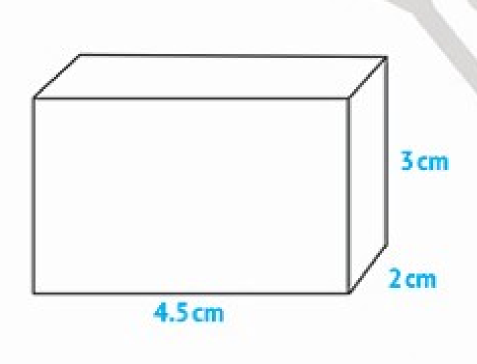
ⓕ A cubic meter is a unit of ....

ⓖ If we doubled all dimensions of a cuboid, then the ratio between the new volume to the original volume of the cuboid is .... : ....

ⓗ A cuboid with a base area of 12 cm^2, and a height of 6 cm, then its volume = ... cm^3.

2 Find the volume of the following solids:

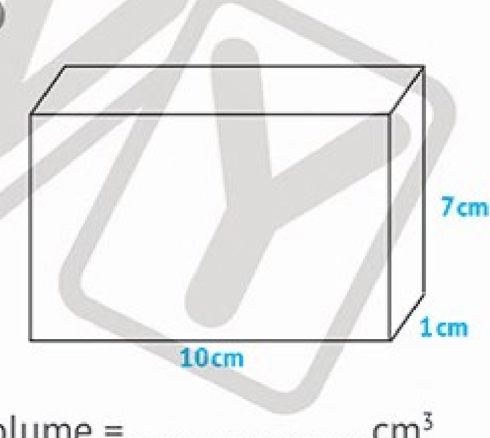
ⓐ





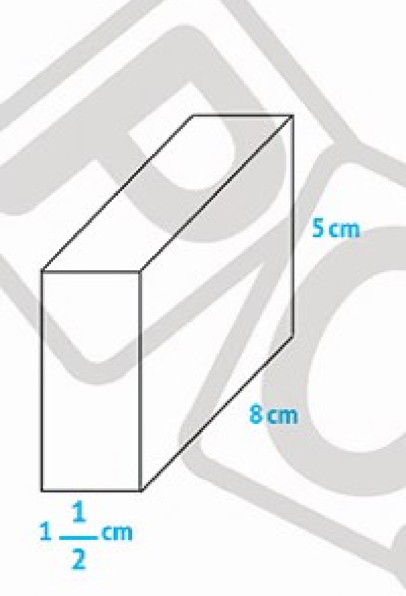
Volume = ... cm^3

ⓑ



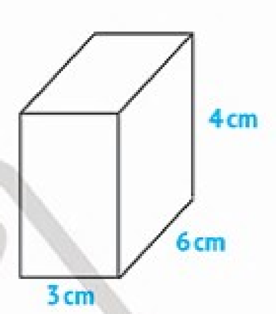
Volume = ... cm^3

c



Volume = ... cm³

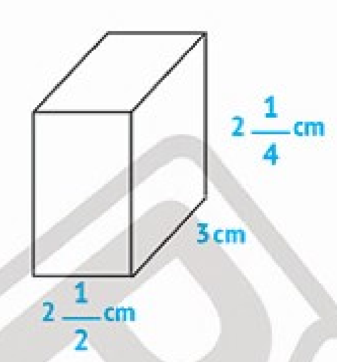
d



Volume = ... cm³

3 Using the following solids, find:

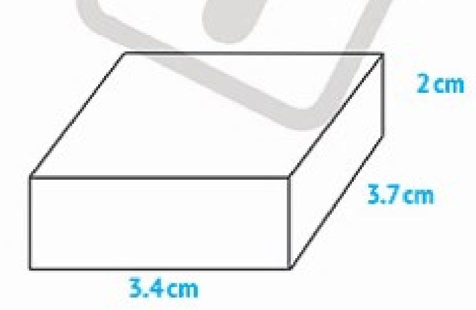
a



Estimating volume = ...

Actual volume: ....

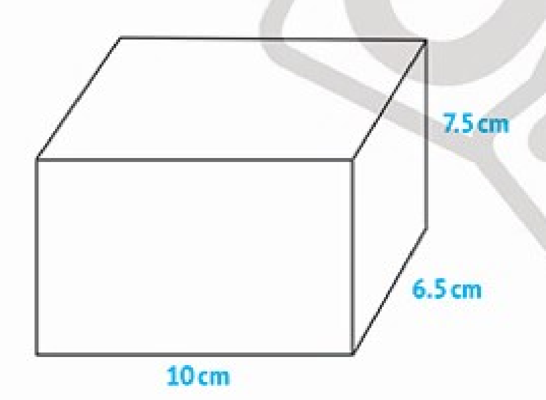
b



Estimating volume = ...

Actual volume: ....

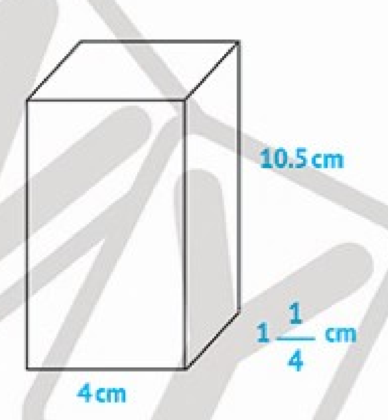
c



Estimating volume = ...

Actual volume: ....

d



Estimating volume = ...

Actual volume: ....

4 Answer the following:

a. If 7 cm, 5 cm and 10 cm, are dimensions of a cuboid, then what is its volume?

....

....

b. If the base area of cuboid is 36 cm^2 and its height is 5 cm, then find the volume of the cuboid.

....

....

c. If the volume of a cuboid is 720 cm^3 and its height is 10 cm, find its base area.

....

....

d. A cuboid with dimensions of $4\frac{1}{2}$ cm, 8 cm, and 2.5 cm. If one of its dimensions has been doubled, find the volume of the new cuboid.

....

....

e. A cuboid's volume is 360 cm^3 and its base dimensions are 4 cm and 6 cm. Find its height

....

....

f. A swimming pool with dimensions of 4 m, 7 m, and 1 m. If all dimensions have been doubled, then find the new volume.

....

....

Assessment on Lessons 3&4

Unit 13

1 Choose the correct answer:

a) The volume of a cuboid whose dimensions are 5 cm, 8 cm, and 2 cm is .... cm^3. (40 or 80 or 160 or 16)

b) If the base area of a cuboid is 180 cm^2 and its height is 9 cm. Then its volume is .... cm^3. (20 or 180 or 1620 or 810)

c) If the volume of a cuboid is 280 cm^3 and its base area is 70 cm^2. Then its height is .... cm. (40 or 7 or 4 or 40)

d) If we double one of the dimensions of a cuboid, then the ratio between the original volume and the new volume is ......: ...... (1:2 or 1:4 or 1:8 or 8:1)

2 Complete:

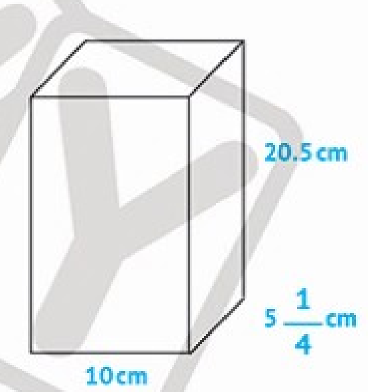
a) The volume of a cuboid = ... x ....

b) A cubic centimeter is a unit of ....

c) A cuboid's volume is 50 m^3. If we doubled all of its dimensions, then the volume of the new cuboid = ... cm^3.

d) A cuboid has a base area of 40 cm^2 and a height of 7 cm. Then its volume = ... cm^3.

3 Answer the following:



- Estimating volume: ....
- Actual volume: ....

Assessment 1 on Unit 13




First: **Choose the correct answer:**

1. The surface area of a cuboid with dimensions of 3 cm, 5 cm, and 7 cm is .... cm^2.

   (2 X 15 or 3 X 5 X 7 or 2 X (15 + 35 + 21) or 4 + 10 + 20)

2. The formula for the area of a cube is ....

   ($6 s^2$ or $4 s^2$ or $6 s$ or s^2)

3. A cubic meter is a unit of ....

   (capacity or mass or volume or time)

4. If the base area of a cuboid is 80 cm^2. and its height is 9 cm. then its volume is .... cm^3. (720 or 72 or 360 or 810)

5. The ratio between the surface area of a cube and the area of one face is ......

   (1 : 4 or 1 : 6 or 4 : 1 or 6 : 1)

Second: **Complete:**

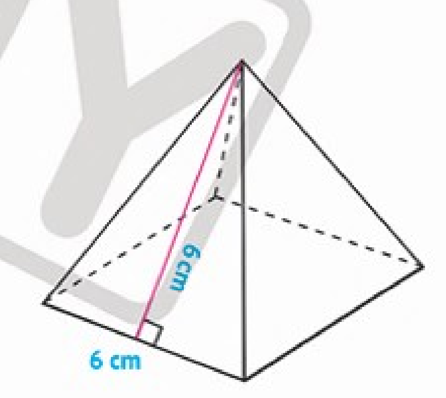
1. The volume of a cuboid = ... X .... X ....
2. A cube of side length of 30 cm, then the area of one face is .... cm^2.
3. If the dimensions of a cuboid are 10 m, 5 m, and 4 m. Then its volume = ... m^3.
4. The surface area of a cube of edge of 6 cm is .... cm^2.
5. A cuboid whose base area is 32 m^2, and its height 7 m, then its volume = ... m^3.

Third: **Answer the following:**

- Surface area =

....

.... cm^2.



Assessment 2 on





First: **Choose the correct answer:**

1. A cuboid whose base area is 45 cm^2, and its height is 5 cm, then its volume = ... cm^3. (9 or 225 or 18 or 125)
2. A cube with surface area of 60 cm^2. Then the area of one face is ...... cm^2. (10 or 6 or 27 or 25)
3. The ratio between the area of one face and its surface area is .... (1 : 4 or 1 : 6 or 4 : 1 or 6 : 1)
4. A cuboid has dimensions of 0.5 dm, 7 cm, and 2 cm, then its surface area = ... cm^2. (35 or 14 or 59 or 37)
5. The volume of a cuboid whose dimensions are 10 cm, 6 cm, and 3 cm is .... cm^3. (90 or 180 or 160 or 19)

Second: **Complete:**

1. If the sum of edges of a cube is 48 cm, then its surface area is .... cm^2.
2. The ratio of the area of one face of a cube and its surface area is .... : ....
3. If we double three dimensions of a cuboid, the ratio between the volume of new cuboid and original cuboid is .... : ....
4. The surface area of a square-based pyramid = ...
5. A container in the shape of a cuboid whose dimensions are 5 dm, 4 dm, and 8.5 dm, then its volume = ... dm^3.

Third: **Answer the following:**

- If the volume of a cuboid is 720 cm^3 and its height is 10 cm. Find its base area. ....

....

Final Revision
on Theme 3
Units 8, 9&10

First: **Choose the correct answer:**

1. The reciprocal of 9 is .... (1 or $\frac{1}{9}$ or 19 or 9)

2. The reciprocal of $\frac{2}{7}$ is .... (2 or $\frac{7}{2}$ or 7 or $\frac{2}{7}$)

3. The reciprocal of $\frac{1}{2}$ is .... (1 or 12 or $\frac{1}{2}$ or 2)

4. $\frac{3}{4}$ X .... = 1 (0 or 1 or $\frac{4}{3}$ or $\frac{3}{4}$)

5. $\frac{3}{6}$ ÷ .... = 1 (2 or $\frac{1}{2}$ or 6 or $\frac{6}{3}$)

6. $\frac{2}{3} \div \frac{1}{5}$ = ... ($\frac{2}{3}$ X 5 or $\frac{3}{2}$ X 5 or $\frac{3}{4} \times \frac{1}{5}$ or $\frac{4}{3} \times \frac{1}{5}$)

7. .... ÷ .... = $\frac{4}{7} \times \frac{5}{4}$ ($\frac{7}{4} \div \frac{5}{4}$ or $\frac{4}{7} \div \frac{4}{5}$ or $\frac{7}{4} \div \frac{5}{4}$ or $\frac{2}{3} \times \frac{1}{5}$)

8. Any number multiplied by its reciprocal equals ....
(0 or 1 or the same number or twice the number)

9. $\frac{2}{5}$ ☐ the reciprocal of 5 ($<$ or $=$ or $>$ or $\leqslant$)

10. The reciprocal of .... is $1\frac{2}{3}$. ($2\frac{2}{3}$ or $1\frac{3}{2}$ or $\frac{3}{5}$ or $\frac{5}{3}$)

11. .... ÷ $\frac{1}{2} = \frac{1}{3}$ ($\frac{1}{6}$ or 6 or $\frac{3}{1}$ or $\frac{2}{3}$)

12. $\frac{5}{6} \div \frac{2}{3}$ = ... ($\frac{5}{2}$ or $1\frac{1}{4}$ or $\frac{3}{2}$ or $\frac{4}{5}$)

13. 5.2 X 0.3 = ... (0.156 or 1.56 or 15.6 or 156)

14. 45 ÷ 0.9 = ... ÷ 9 (0.45 or 450 or 45 or 4.5)

15 If a water tap is leaking 420 litres of water in one hour, then the rate of leaking = ... l/min. (420 or 7 or 70 or 42)

16 If Ahmed has 64 LE and Yasmin has 24 LE, then the ratio of what Yasmin has to what Ahmed has is .... (8 : 3 or 3 : 8 or 6 : 8 or 8 : 32)

17 35 : 20 = ... : .... (7 : 4 or 4 : 7 or 5 : 7 or 4 : 5)

18 An amount of food is distributed between two people in the ratio 3:4, then what the first person took = ... the total. ($\frac{3}{4}$ or $\frac{3}{7}$ or $\frac{4}{7}$ or $\frac{4}{3}$)

19 The ratio between the perimeter of a square and its side length is ....

(4 : 1 or 1 : 3 or 3 : 1 or 1 : 4)

20 A factory produces 5,400 cans of soda in 9 hours, then the rate of production = ... can/hour. (6 or 60 or 600 or 6,000)

21 Mark spends 120 LE in 4 days. What's the rate of what he spends per day? (50 or 30 or 15 or 60)

22 Which ratio of the following equals $\frac{1}{3}$? ($\frac{6}{12}$ or $\frac{4}{20}$ or $\frac{5}{15}$ or $\frac{5}{20}$)

23 Which ratio of the following does not equal the fourth?

($\frac{4}{16}$ or $\frac{5}{20}$ or $\frac{7}{28}$ or $\frac{10}{30}$)

24 Which ratio of the following is in the simplest form?

($\frac{3}{12}$ or $\frac{7}{21}$ or $\frac{9}{17}$ or $\frac{5}{30}$)

25 If Mohamed spends 120 pounds within 4 days, then Mohamed spends .... in 10 days. (150 or 180 or 300 or 1,200)

26 The ratio between the perimeter of an equilateral triangle and its side length = ... (1 : 4 or 4 : 1 or 1 : 3 or 3 : 1)

27 The ratio 9 : 12 in the simplest form equals ....

($\frac{1}{2}$ or $\frac{1}{3}$ or $\frac{3}{4}$ or $\frac{2}{3}$)

28 A worker paints a wall with an area of 36 m^2 in 4 hours, then the rate of painting is .... m^2/hr. (7 or 8 or 9 or 10)

29 175 : 125 = ... : .... (5 : 3 or 5 : 4 or 2 : 3 or 7 : 5)

30 $\frac{7}{5}$ is equivalent to .... ($\frac{7}{15}$ or $\frac{15}{14}$ or $\frac{25}{35}$ or $\frac{35}{25}$)

31 $\frac{14}{15}$ and $\frac{3}{4}$ are .... (equivalent ratios or not equivalent ratios)

32 36 : 72 = ... : .... (6 : 18 or 5 : 4 or 1 : 2 or 3 : 5)

33 The ratio between two numbers is 2 : 5. If the first number becomes 8 then the second number will be .... (8 or 10 or 15 or 20)

34 A carpenter needs 40 m^2 to make 10 tables, then the rate of used wood = ... m^2/table. (2 or 3 or 4 or 300)

35 4 : 9 is equivalent to .... (9 : 2 or 18:81 or 18:4 or 20:45)

36 If $\frac{3}{7} = \frac{15}{x}$, then x = ... (3 or 5 or 15 or 35)

37 If 1 : x = 0.5, then x = ... (1 or 2 or 3 or 3)

38 .... are equivalent ratios.

($\frac{2}{6}$, $\frac{9}{18}$ or $\frac{12}{15}$, $\frac{16}{20}$ or $\frac{6}{7}$, $\frac{12}{21}$ or $\frac{2}{3}$, $\frac{5}{10}$)

39 If 3 : 5 = 12 : 4 x, then x = ... (20 or 24 or 5 or 10)

40 If x : 15 = 1 : 3, then x + 3 = ... (5 or 8 or 9 or 11)

41 5 : x = 0.2, then x = ... (5 or 10 or 25 or 0.5)

42 Salma reads 280 pages of stories weekly, then she reads .... pages daily. (40 or 7 or 14 or 70)

43 If Mark has 18 LE and Ibrahim has 54 LE, then the ratio of what Ibrahim has to what mark has is .... : .... (1 : 8 or 8 : 3 or 3 : 1 or 6 : 12)

44 $\frac{5}{15}$ and $\frac{3}{9}$ are .... (equivalent ratios or not equivalent ratios)

45 The ratio of two numbers is 1 : 4. If the first number becomes 5, then the second number will be .... (42 or 14 or 20 or 16)

46 If 8 : x – 1 = 6 : 12, then the value of x = ... (17 or 8 or 15 or 7)

47 Ahmed needs to study for 49 hours to finish his weekly homework, so the rate of his study per day is .... hr. (2 or 3 or 4 or 7)

48 If a car covers 240 km in 3 hours, then its speed is .... km/hr. (70 or 80 or 90 or 110)

49 2.3 ton ☐ 2300 kg (> or < or = or otherwise)

50 24 km/hr = ... m/min (4000 or 400 or 40 or 2400)

51 5.3 pounds = ... piasters (5300 or 530 or 53 or 5.3)

52 If a cyclist runs at 42 km/hr, his speed in meters per minute is .... (7 or 70 or 700 or 42,000)

53 $\frac{2}{8}$ = ... % (35 or 45 or 12.5 or 25)

54 $1\frac{1}{4}$ = ... % (25 or 12.5 or 125 or 1,250)

55 $\frac{9}{18}$ = ... % (30 or 25 or 50 or 60)

56 10 % of .... = 27 (540 or 270 or 10 or 2.7)

57 35% of 160 = ... (56 or 5.6 or 56/100 or 560)

58 30% of a number equals ....

(its third or its three-tenths or its three-fifths or its three-sevenths)

59 60 % of .... = 360 (0.6 or 6 or 60 or 600)

60 5% of .... LE = 120 LE (240 or 2400 or 1200 or 120)

61 If the original price of a dress is 980 LE, then its sale price after applying a discount of 20% is .... (196 or 784 or 1176 or 960)

62 In a restaurant, there's 10% added to each meal as service. If the price of a meal is 240 LE, then the price of the meal after adding service is .... LE. (248 or 264 or 24 or 258)

63 $1 - \frac{3}{4}$ = ... % (25 or 2.5 or $\frac{1}{4}$ or 0.25)

64 The percentage that represents 340 LE of 1,000 LE is ....

(340% or 34% or 340% or 3.5%)

65 61% of a kilogram = ... gram (61 or 610 or 6.1 or 6100)

Second: Complete:

1 The reciprocal of 6 is ....

2 The reciprocal of $1\frac{3}{5}$ is ....

3 $\frac{7}{5} \div \frac{1}{5}$ = ...

4 The number which has no reciprocal is ....

5 $\frac{7}{13} \div$ .... = 1

6 5 ÷ .... = 5 X 2

7 The reciprocal of the number .... is $3\frac{3}{5}$.

8 If $53 \times 31 = 1{,}643$, then $16.43 \div 3.1 =$ ....

9 If $25 \times 33 = 825$, then $2.5 \times 3.3 =$ ....

10 $0.02 \times 0.03 =$ ....

11 $4.2 \div 0.07 =$ .... $\div 7$

12 .... $\div 3.5 = 1{,}200 \div 35$

13 $1\frac{3}{4} \div$ .... $= 4$

14 $6 \div \frac{5}{7} =$ .... X ....

15 $5.7 \times$ .... $= 570$

16 .... $\div 0.8 = 2.3$

17 .... $\div 4 = \frac{3}{8}$

18 $\frac{4}{15} \div \frac{2}{3} =$ .... × ....

19 The ratio between 360 and 540 is .... : ....

20 The ratio between the side of a rhombus and its perimeter is .... : ....

21 Farida spends 480 LE in 4 days, then the rate of what she spends is .... LE/day.

22 In the ratio 5 : 7, the first term is .... and the second term is ....

23 If a car covers 408 km in 3 hours, then its average speed = ... km/hour.

24 The ratio between two sides in the same square is .... : ....

25 The ratio between two numbers is 4 : 8. The first number becomes 18, then the second number is ....

26 If $\frac{x}{8} = \frac{3}{4}$, then $x =$ ....

27 If $4 : 7 = x : 35$, then $x - 3 =$ ....

28 If 2 : x = 16 : 24, then 3x = ...

29 If $\frac{A}{B} = \frac{C}{D}$, then A × D = ...

30 $\frac{2}{x}$ and $\frac{8}{20}$ are equivalent ratios, then x = ...

31 $\frac{2}{6} = \frac{3}{\dots} = \frac{\dots}{12} = \frac{5}{\dots} = \frac{\dots}{30}$

32 $\frac{x+3}{14} = \frac{1}{2}$, then x = ...

33 Gamal studies for 48 hours in 8 days, then he studies ...... hours in a day.

34 A printer prints 27 papers in 3 minutes, then it prints .... papers in 8 minutes.

35 A cyclist covers 8 km in 2 minutes, then he will cover .... km in 5 minutes

36 12 km/hr = ... = ... km/min

37 280 gram/sec = ... = ... kg/min

38 71,500 cm = ... km

39 $\frac{23}{25}$ = ... %

40 0.29 = ... %

41 $2\frac{15}{100}$ = ... %

42 A number which 18% of it equals 54 is ....

43 75% of 200 = ...

44 1 – 37% = ...

45 .... % of 180 = 45

46 60 % of .... LE = 360 LE

47 If there are 60 students in class and 95% passed the test, then the students who failed the test (in numbers) are .... students.

48 Gehan scored 540 out of 600. Then the percentage of marks scored is ....

49 50 m/min = ... = ... km/hr

50 1 – 9% = ... %

Third: **Answer the following:**

1. Ahmed has $\frac{5}{7}$ meters of pipe, and he wants to divide it into 15 pieces of equal length to make models of small robots. What is the length of each piece of pipe that Ahmed will use in each robot?

....

....

2. Nader bought 12 pizza pies and divided them among his friends, each of whom got $\frac{2}{3}$ of the pie. How many friends does Nader have?

....

....

3. Nadia bought $\frac{8}{9}$ kg of apples and she wants to divide them among her three children. What is the share of each child?

....

....

4. Hossam distributed 18 cake molds to a group of children, and each of them got $\frac{2}{3}$ cake. How many children did Hossam distribute cake to?

....

....

5. Mona bought 9 meters of fabric, she paid 214.2 pounds. What is the price of each meter of fabric?

....

....

6 A car consumed 280 liters of gasoline in 4 months. How many liters did the car consume on average in one month?

....

....

7 Murad bought 3 notebooks for 4.75 LE each and 5 pens for 1.25 LE each. Calculate the money Murad paid.

....

....

8 Mark bought 16 boxes of juice; the price of each one is 5.5 pounds. How many pounds did he pay the seller?

....

....

9 Using the following figure, complete the following:

a The ratio between shaded squares and white squares in the simplest form is .... : ....

b The ratio between shaded squares and all squares in the simplest form is .... : ....

c The ratio between white squares and all squares in the simplest form is .... : ....

10 Ahmed walks 28 km in a week. Calculate the distance that Ahmed walks per day.

....

....

11 Complete the following ratio tables:

ⓐ

1	2	....	....
3	....	9	18

ⓑ

....	....	12	100
20	15	60	....

12 An orange export company puts every 25 oranges in one box. Answer the following:

ⓐ The number of oranges in 10 boxes = ...

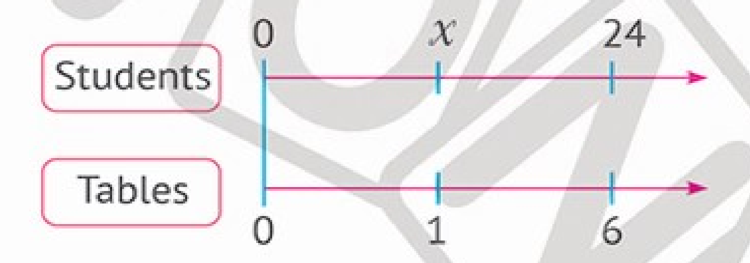
ⓑ The number of boxes that are enough to contain 225 oranges = ...

13 Galal uploads videos into YouTube, if the video takes 15 minutes:

ⓐ How many videos will be uploaded in 375 minutes?

ⓑ How long will Galal take to upload 4 videos to YouTube?

14 From the following double number line, find the value of x:



15 Laine reads 360 pages in 240 minutes, and Omar reads 45 pages in 25 minutes. Are they reading in equivalent ratios? Explain your answer.

....

....

16 Which is better to buy?

8 cans of green beans for 36 LE or 13 cans of green beans for 55.25 LE? Explain your answer. **(Where all cans are the same kind)**

....

....

17 Adham wants to plant trees; it takes him 10 minutes to plant a tree.

a How many trees do he plant in 2 hours?

b How long will he take to plant 24 trees?

18 Lila earns 20 points for every 5 stars she collects in a video game.

Complete the ratio tables, then find the unit rate:

Point	4	....	16	20	28
Star	....	3	....	5	....

19 Omar is making loaves of banana bread. He makes 2 loaves of banana bread, and he uses 5 cups of flour in all. How much flour does he use per loaf?

....

....

20 A factory (A) produces 800 lamps in 40 hours, and another factory (B) produces 400 lamps of the same kind in 25 hours. Which factory has a better rate of production?

....

....

21 Mona bought 5 kg of strawberries; she paid LE 15. How much money does she pay to buy 7 kg?

....

....

22 A boy walks 15 km in 2 hours and 30 minutes. Calculate his average speed in meters per minute.

....

....

23 There's a dog running at a constant speed of 54 km/hr; convert its speed into m/min.

....

....

24 If the percentage of the number of girls in a school is 67%, find the percentage of the number of boys in the school.

....

....

25 Due to leakage, 30% of the water was lost from a water tank. If only 360 liters of water were lost, find the total capacity of the water tank.

....

....

26 An employee saves 700 LE monthly, if his monthly income is 4,000 LE:

a Find the percentage of what he saves monthly.

b Find the percentage of what he spends monthly.

27 Engy bought a car for 140,000. She paid 10% of its price. How much money did she pay?

....

....

28 A piece of cloth of 28 meters long was put in water, it shrunk by 7%. What is the length after shrinking?

....

....

29 The production cost of an 8 feet fridge is 5,400 LE, a 10% production tax is added to the cost. What is the total cost of the fridge?

....

....

30 An iPad that costs 20,800 LE is 20% off. Find:

a The money saved.

b The sale price of the iPad.

Final Revision
on Theme 4
Units 11, 12&13

First: **Choose the correct answer:**

1. All the following lie in the 4^{th} quadrant, except ....

   ((2 , -3) **or** (-4 , -3) **or** (5 , -1) **or** (1 , -1))

2. If the point (x , -7) lies in the 3^{rd} quadrant, then the value of x is ....

   (2 **or** 4 **or** -1 **or** 1)

3. The point .... lies on the x-axis. ((2 , -3) **or** (0 , -3) **or** (4 , -1) , ($1\frac{1}{4}$,0))

4. The point ...... lies on the y-axis. ((2 , -7) **or** (0 , -7) **or** (1 , -1) , (5 , 0))

5. Which of the following lies in the 2^{nd} quadrant?

   ((2 , -3) **or** (0 , -7) **or** (-1 , 9) **or** (7 , 0))

6. The image of the point (0 , 5) by reflection on y-axis is ....

   ((5,0) **or** (0 , -5) **or** (5 , -5) **or** itself)

7. The image of the point (2 , -9) by reflection on x-axis is ....

   ((2 , 9) **or** (-9 , 2) **or** (-2 , -9) , (-2 , 9))

8. Which point of the following can be a vertex of a right-angled triangle if the other vertices are (0, 8) and (4, 0)?

   ((0 , 1) **or** (0 , -1) **or** (0 , 0) **or** (1 , 1))

9. The distance between the two points (-5 , 6) and (-5 , 2) = ... units length.

   (-5 **or** 4 **or** 8 **or** 0)

10. The distance between -6 and 5 on the number line is ....

    (1 **or** -1 **or** 11 **or** 5)

11. The two points (3 , −7) and (−6 , −7) lie on the ....

    (horizontal line **or** vertical line **or** inclined line **or** otherwise)

12 The two points (3 , −7) and (3 , −3) lie on the ....

(horizontal line or vertical line or inclined line or otherwise)

13 A parallelogram which all sides are equal in length is called a ....

(square or rectangle or rhombus or trapezium)

14 A parallelogram which has a right angle is called a ....

(square or rectangle or rhombus or trapezium)

15 A parallelogram which all sides are equal in length and has right angle is called a .... (square or rectangle or rhombus or trapezium)

16 A parallelogram with dimensions of AB = 4 cm and BC = 6 cm, then the length of the corresponding height of AB [ ] the length of the corresponding height of BC. (> or < or = or otherwise)

17 If the area of a parallelogram is 98 cm^2, and its base is 7 cm, then its corresponding height .... cm. (14 or 6 or 7 or 28)

18 If the base length of a parallelogram is 4 cm, and its corresponding height is 7 cm, then its area = ... cm^2. (14 or 28 or 32 or 16)

19 If the area of a parallelogram is 54 cm^2, and its base is 9 cm, then its corresponding height .... cm. (54 or 6 or 9 or 18)

20 A parallelogram with dimensions of AB = 14 cm and BC = 10 cm, then the length of the corresponding height AB [ ] the length of the corresponding height to BC. (> or < or = or otherwise)

21 The number of heights of any triangle is .... (0 or 1 or 2 or 3)

22 A triangle with base length of 10 cm, and its corresponding height is 6 cm. Then its area = ... cm^2. (30 or 15 or 45 or 60)

23 The number of heights of a right-angled triangle is ..... (0 or 1 or 2 or 3)

24 If the area of a triangle is 25 cm^2, and its base is 10 cm, then the height is .... cm. (5 or 2.5 or 250 or 50)

25 The area of a triangle = ... ($\frac{1}{2}$ b x h or b x h or W x L or $\frac{1}{4}$ b x h)

26 If the perimeter of an equilateral triangle is 36 cm, its area is 36 cm^2. Then its height is .... cm. (3 or 10 or 30 or 6)

27 A triangle with base length is 8 cm, and its corresponding height is 5 cm. Then its area = ... cm^2. (30 or 15 or 40 or 20)

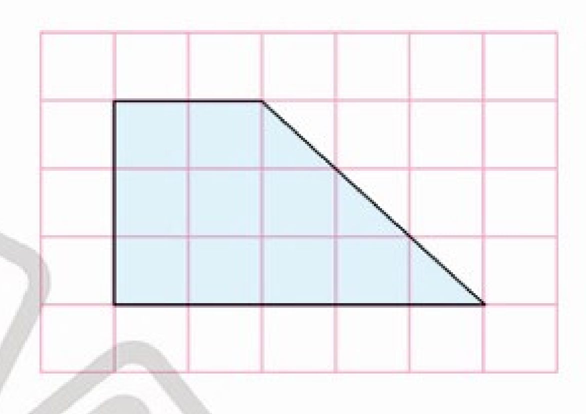
28 Which of the following can be used to calculate the area of the following trapezium?

((2 x 3) + (3 x 4) or

(2 + 3) + [$\frac{1}{2}$ (3 x 3)] or

(2 x 3) – [$\frac{1}{2}$ (3 x 3)] or

(2 x 3) + [$\frac{1}{2}$ (3 x 3)])



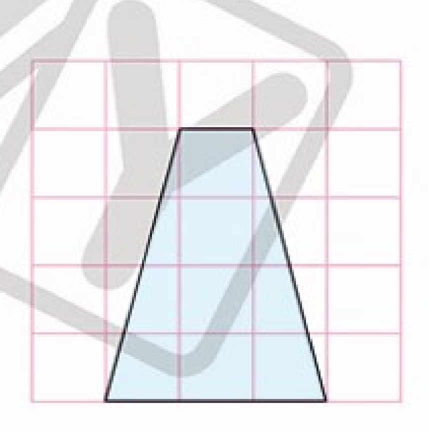
29 Which of the following can be used to calculate the area of the following trapezium?

((1 x 4) + (4 x 1) + (4 x 1) or

(4 x 1) + [$\frac{1}{2}$ (4 x 1)] + [$\frac{1}{2}$ (4 x 1)] or

(1 + 4) - [$\frac{1}{2}$ (4 x 1)] - [$\frac{1}{2}$ (4 x 1)] or

(1 x 4) - [$\frac{1}{2}$ (4 x 1)] - [$\frac{1}{2}$ (4 x 1)]



30 A cube with a surface area of 96 cm^2, then the edge length is .... cm.

(4 or 3 or 27 or 16)

31 The surface area of a cuboid whose dimensions are 6 cm, 4 cm, and 1 cm equals .... cm^2. (24 or 68 or 30 or 10)

32 If the sum of edges of a cube is 36 cm, then the area of one face is .... cm^2. (6 or 18 or 72 or 9)

33 A cuboid with dimensions of 0.4 dm, 7 cm, and 3 cm, then its surface area = ... cm^2. (21 or 61 or 122 or 20.8)

34 The surface area of a cuboid with dimensions of 2 cm , 5 cm, and 10 cm is .... cm^2.

(2 X 17 or 2 X 5 X 10 or 2 X (10 + 50 + 20) or 4 + 10 + 20)

35 The formula for the area of one face of a cube is ....

($6\ s^2$ or $4\ s^2$ or 6 s or s^2)

36 The ratio between the surface area of a cube and the area of one face is .... (1 : 4 or 1 : 6 or 4 : 1 or 6 : 1)

37 A cuboid with a height of 7 cm , a length of 9 cm, and a width of 1 cm, then the surface area is .... (79 or 158 or 63 or 34)

38 A cube of side length of 10 cm, then the area of one face is ...... cm^2.

(0.1 or 10 or 100 or 1,000)

39 The volume of a cuboid whose dimensions are 5 cm, 8 cm, and 2 cm is .... cm^3. (40 or 80 or 160 or 16)

40 A cube with a surface area of 150 cm^2, then the edge length is

.... (9 or 5 or 25 or 6)

41 If the base area of a cuboid is 180 cm^2, and its height is 9 cm, then its volume is .... cm^3. (20 or 180 or 1620 or 810)

42 If the volume of a cuboid is 280 cm^3, and its base area is 70 cm^2, then its height is .... cm. (40 or 7 or 4 or 40)

43 If we double one of the dimensions of a cuboid, then the ratio of the volume between the original cuboid and the new cuboid is .... : ....

(1 : 2 or 1 : 3 or 1 : 4 or 1 : 8)

44 The formula for the surface area of a cube is ....

(6 s^2 or 4 s^2 or 6 s or s^2)

45 A cubic meter is a unit of the ....

(capacity or mass or volume or time)

46 If the base area of a cuboid is 80 cm^2, and its height is 9 cm, then its volume is ....cm^3. (720 or 72 or 360 or 810)

47 The volume of a cuboid is 54 cm^3, its base is a square-shaped with side length of 3 cm, then its height = ... cm. (42 or 8.5 or 6 or 4.5)

48 The volume of a cuboid whose dimensions are 10 cm, 6 cm, and 3 cm is .... cm^3. (90 or 180 or 160 or 19)

49 The surface area of a cuboid with dimensions of 8 cm , 3 cm, and 7 cm is .... cm^2. (2 X 18 or 8 X 3 X 7 or 2 X (56 + 24 + 21) or 8 + 3 + 7)

50 A cuboid has a squared base, its base length is 6 cm and its height is 5 cm, then the volume = ... cm^3. (30 or 25 or 180 or 22)

51 A cuboid with a squared base, its volume is 150 cm^3. and its height is 6 cm, then its base length is .... cm. (5 or 6 or 25 or 900)

Second: Complete:

1. The point (5 , -2) is the image of (.......... , ...) by reflection on x-axis.
2. The point (-7 , -1) is the image of (.......... , ...) by reflection on y-axis.
3. The point A (2 , -5) lies in the .... quadrant.
4. The coordinate plane is separated into .... quadrants.
5. The point C (0 , 3) lies on the ....
6. If the image of a point by reflection on y-axis is (-2 , 4), then the point is ....
7. The image of the point (1 , -8) by reflection on the .... is (-1 , -8).
8. The x-coordinate of any point that lies on the y-axis is ....
9. A (4, -4) , B(-5, -4) , then AB = ... unit(s).
10. X (-4 , -1) , Y(-4 , 5) , then XY = ... unit(s).
11. The distance between A(3 , 7) and D(-2 , 7) is .... units.
12. The smaller the value of the y-coordinate, the .... the point to the x-axis.
13. If the point (-2 , 0) moved 3 units in the positive direction of y-axis it becomes ....
14. If the point (4 , 5) moved 2 units in the negative direction of x-axis it becomes ....
15. The area of a square = ... X ....
16. The area of a rectangle = ... X ....
17. The area of a rhombus = ... X ....
18. If the area of a parallelogram is 110 cm^2, and its base is 11 cm, then its corresponding height = ... cm.

19 The area of parallelogram whose base length is 5 cm, and its height is 7 cm is .... cm^2.

20 A rhombus has a side length of 9 cm, and its corresponding height is 6 cm, then its area = ... cm^2.

21 If the area of a square is 81 cm^2, then its side length is .... cm.

22 In a parallelogram, the longer height is corresponding to the .... base.

23 In a parallelogram, the shorter base is corresponding to the .... height.

24 A triangle has a base length of 9 cm and its corresponding base is 4 cm. Then its area = ... cm^2.

25 The number of heights of an equilateral triangle is ....

26 An obtuse triangle, its base length is 12 cm, and its corresponding height is 5 cm, then its area = ... cm^2.

27 If the area of a triangle is 20 cm^2, and its base length is 8 cm. Then the length of corresponding height is .... cm.

28 The perpendicular line segment drawn from the vertex of a triangle to the opposite side is called ....

29 The number of heights of a scalene triangle is ....

30 If the area of triangle is 35 cm^2 and its base is 10 cm, then the corresponding height is .... cm.

31 The surface area of a cube = ...

32 The volume of a cuboid = ...

33 The ratio between any two faces of the cube is .... : ....

34 The surface area of a cuboid with dimensions of 5 cm , 7 cm, and 3 cm is .... cm^2.

35 The surface area of a cube with an edge of 7 cm is .... cm^2.

36 If the surface area of a cube is 96 cm^2. Then the area of one face equals .... cm^2.

37 If the sum of edges of a cube is 48 cm, then its surface area is .... cm^2.

38 A cuboid whose volume is 180 cm^3, its height is 10 cm, and its length is 6 cm. Then its width = ... cm.

39 If the dimensions of a cuboid are 6 m, 7 m, and 2 m.

Then its volume = ... m^3.

40 A cuboid has a volume of 120 m^3. If we double two of its dimensions, then the volume of the new cuboid = ... cm^3.

41 The ratio between the volume of a cuboid and itself after doubling one of its dimensions is .... : ....

42 If we double all dimensions of a cuboid, then the ratio between the new cuboid and the original cuboid is .... : ....

43 The surface area of a square-based pyramid = ...

44 If the surface area of a square pyramid is 88 cm^2, and its base length is 4 cm. Then the height of the side face = ...

45 The volume of a cuboid is 64 cm^3, and the area of its base is 16 cm^2, so its height = ... cm.

Third: Answer the following:

1 By using the opposite coordinate plane, locate the following ordered pairs.

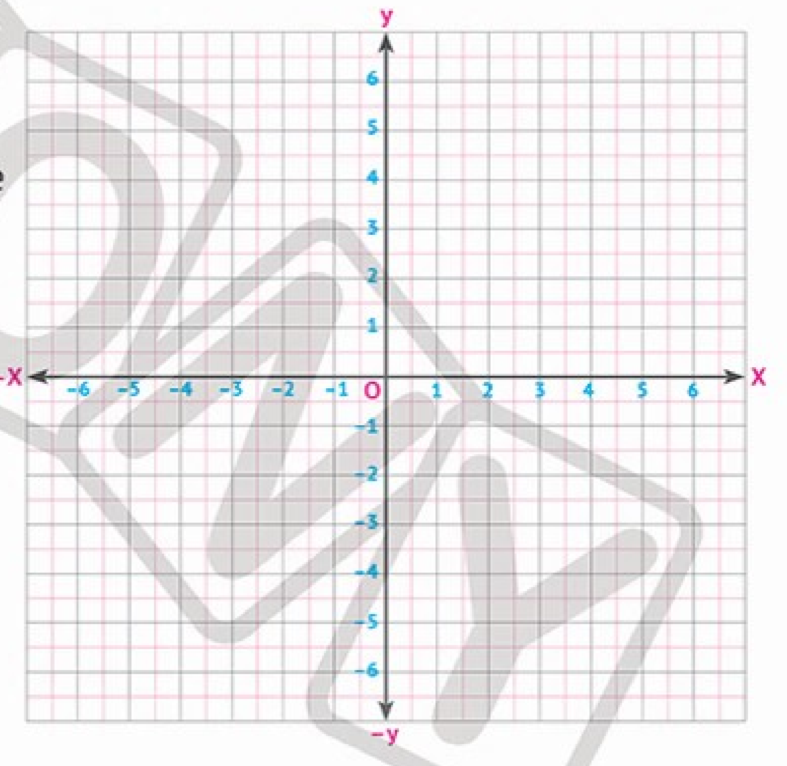
A (5 ,-3), B (0 , 5) ,

C (-6 , 1) ,

D ($-1\frac{1}{2}$,-3) ,

E (-2 , 0) ,

F (1 , 1)



2 Locate the following points on the coordinate plane, then find:

A (5 ,-2) , B (1 , 6), C (5 , 4) , D (-5 , 6),

E(5 ,-5) , F (1 , 4)

The length of AC

= .... units.

The length of BD

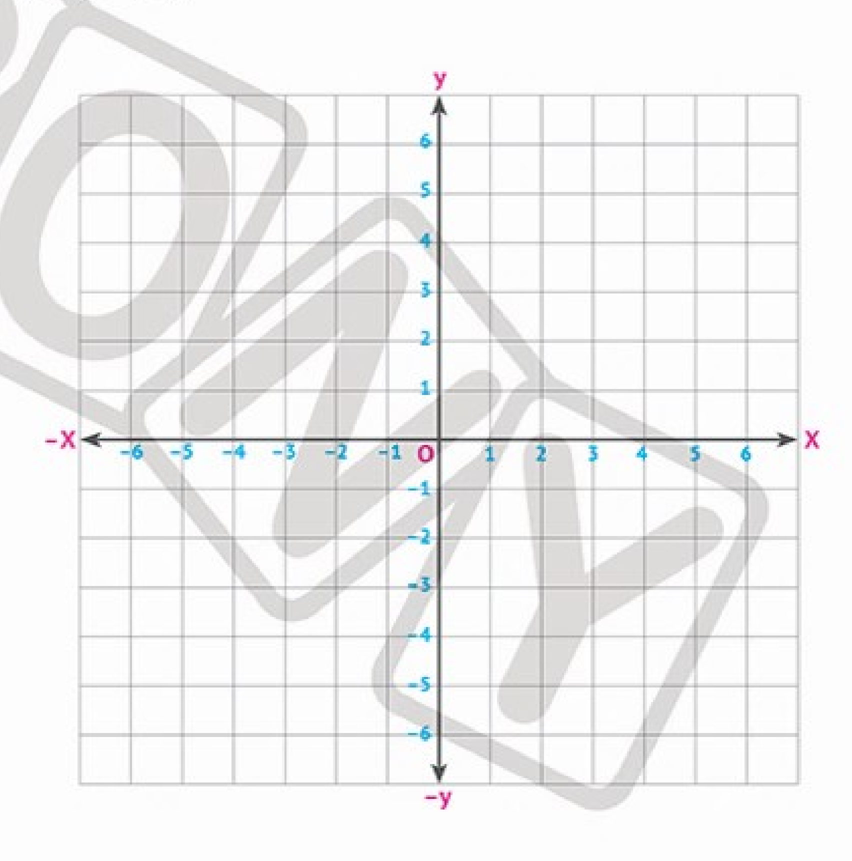
= .... units.

The length of CF

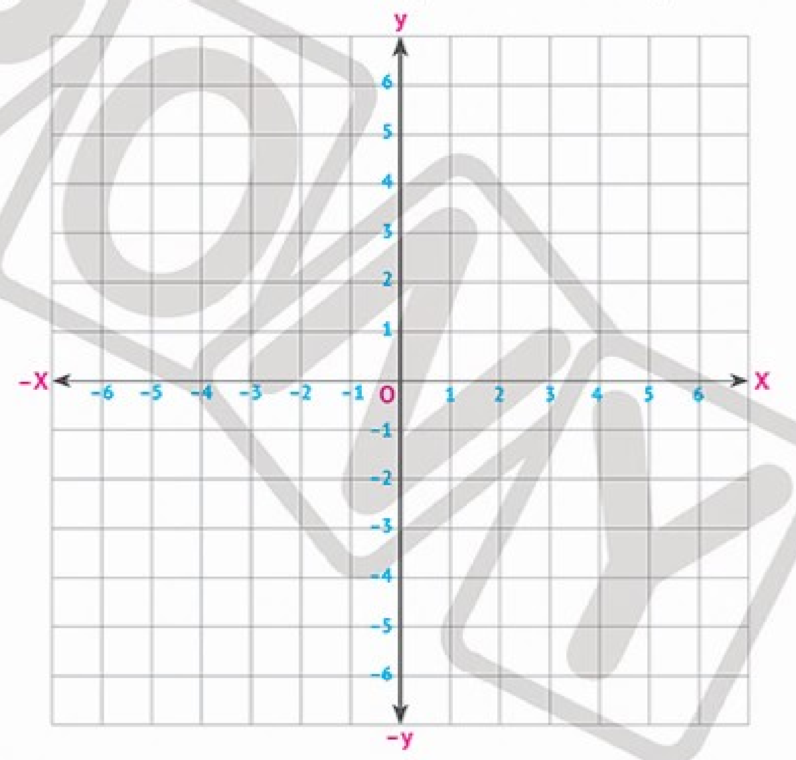
= .... units.

The length of EC

= .... units.

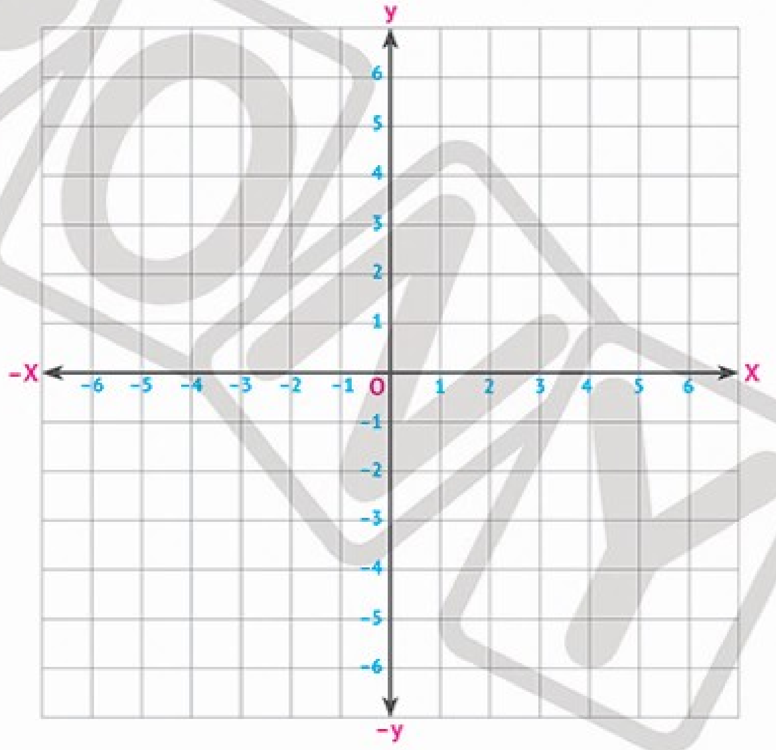


3 The point (−4 , −3) is a vertex of a rectangle with sides 2 units wide and 3 units long. Determine another 3 points to complete the rectangles.



....

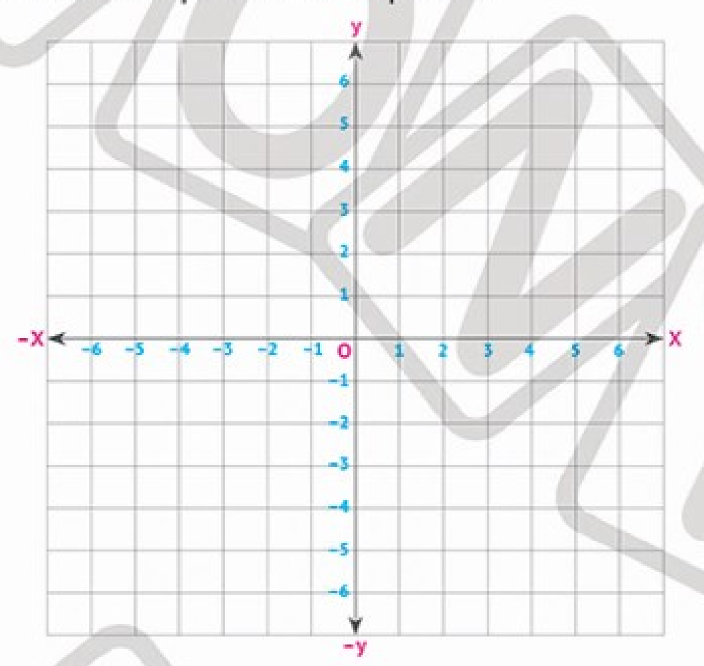
4 Ahmed has drawn a shape with the coordinate points (3 , −5), (−1 , -5), and (−1 , 6). Write the type of the triangle according to the measure of its angles.



....

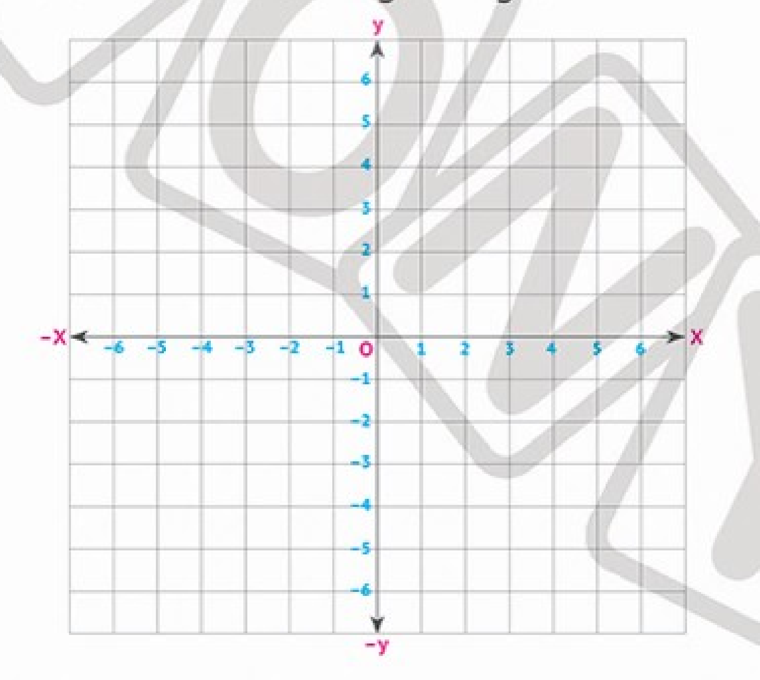
5 By using the identified point on the coordinate plane, determine the other points to create the required geometrical shapes:

The point (0 , −2) is a vertex of square 4 unit length. Determine another 3 points to complete the square.



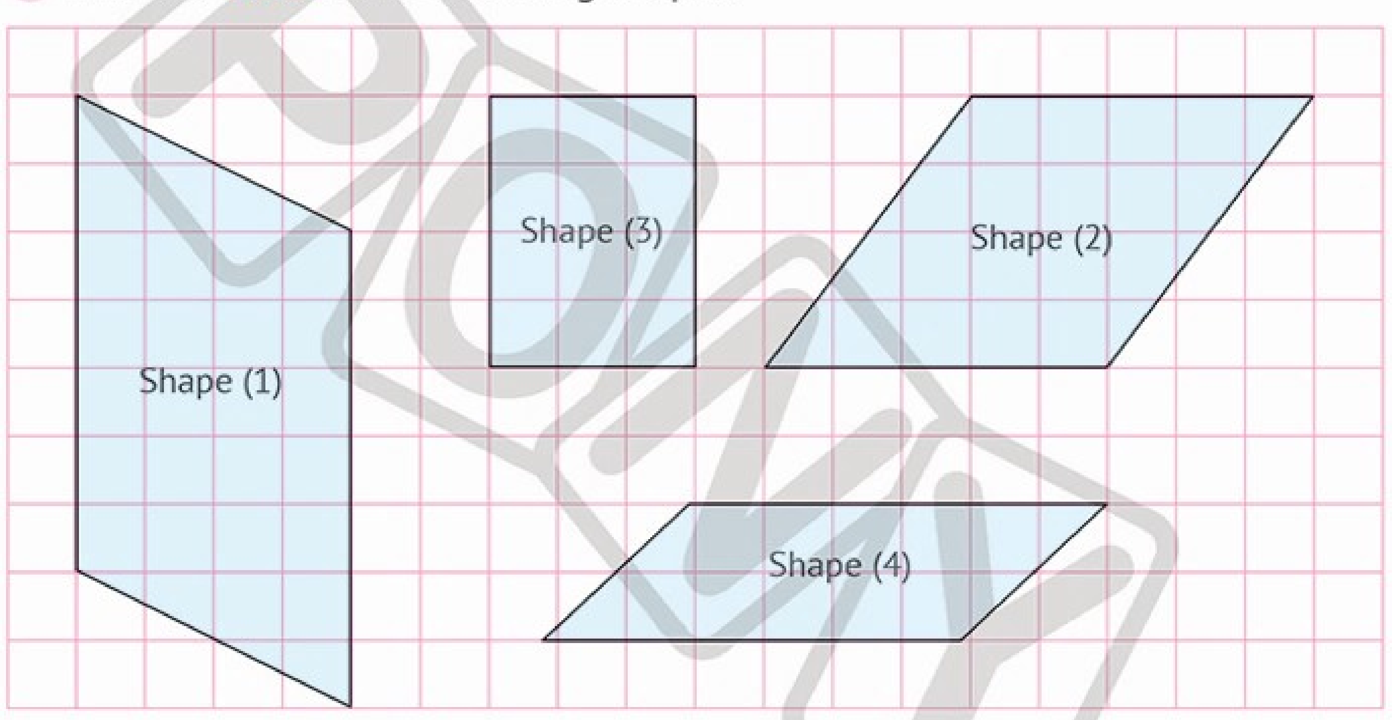
....

6 Using graph paper, plot the points (2 , 1) , (5 , 1) and (5 , 4) and connect them. Does this figure form a right angle? If yes, what are the coordinates of the vertex of the right angle?



....

7 Find the area of the following shapes:



a The area of shape (1) = ... = ... square units.

b The area of shape (2) = ... = ... square units.

c The area of shape (3) = ... = ... square units.

d The area of shape (4) = ... = ... square units.

8 A parallelogram has an area of 84 cm^2, and its base length is 12 cm.

Calculate its corresponding height.

....

....

9 Which is greater in area: A square whose side length is 6 cm or a

rectangle with dimensions of 9 cm and 3 cm?

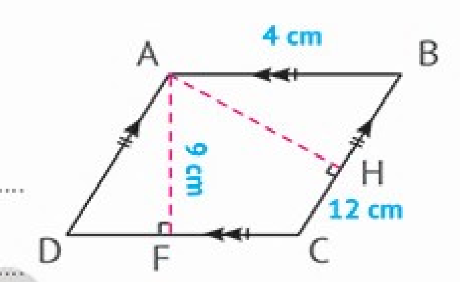
....

....



10 According to the opposite shape:

Find the length of AH.



....

....

11 A triangle has a base length of 20 cm and a corresponding height of 7 cm. Find its area.

....

....

12 A triangle has an area of 45 cm^2, and its base is 9 cm. Find the corresponding height.

....

....

13 Which is greater in area:

A triangle whose base length is 2.4 dm and its corresponding height is 5 cm, or a triangle whose base length is 12 cm and its corresponding height is 8 cm?



....

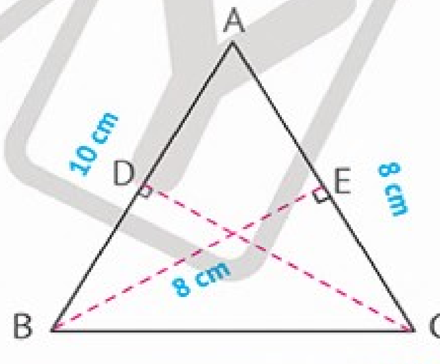
....

14 According to the following triangle,

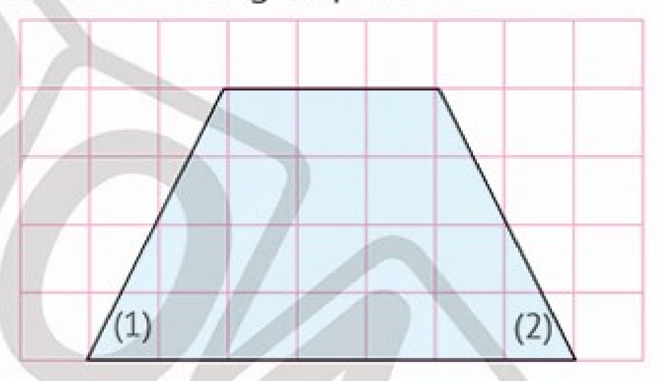
find the length of CD.

....

....



15 Find the area of the following trapezium:



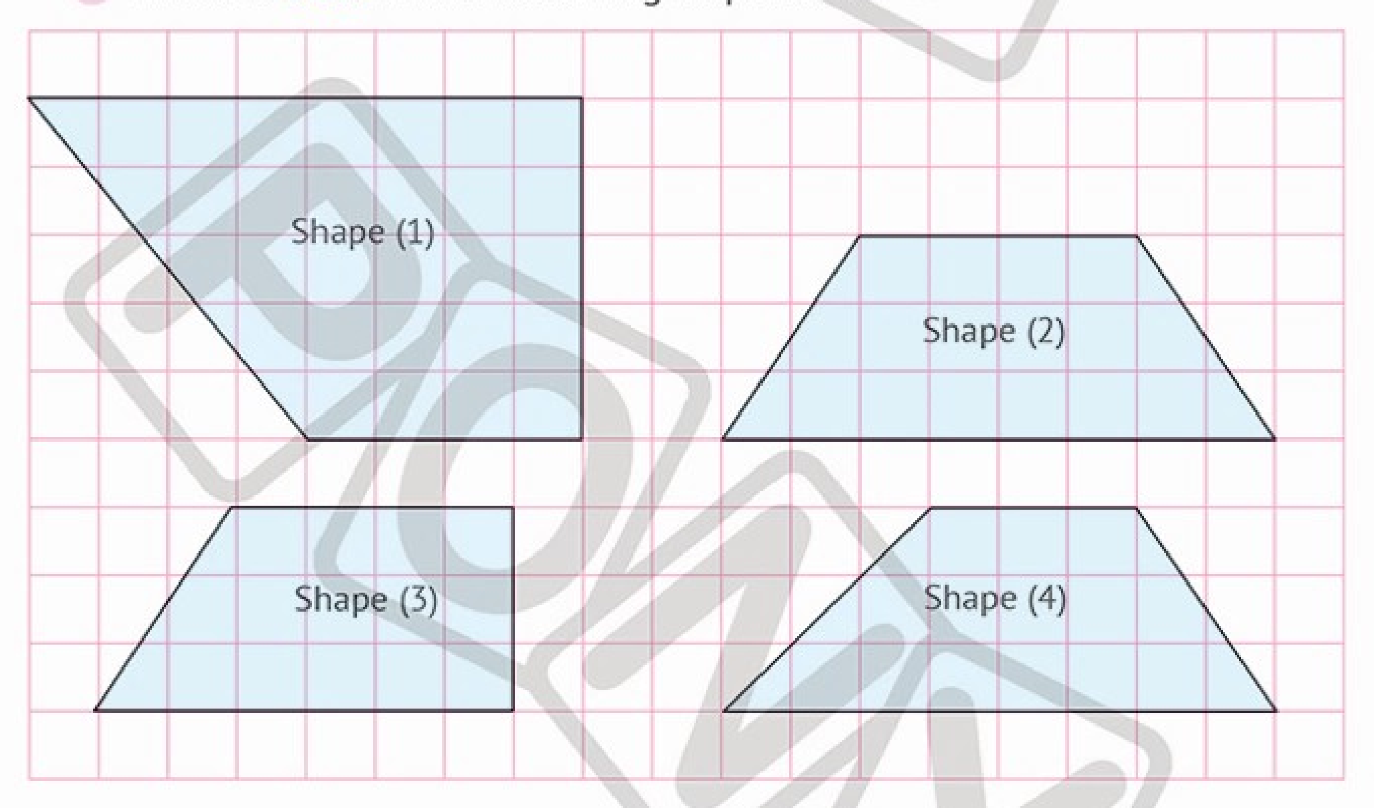
a The area of triangle (1) = ... = ... square units.

b The area of triangle (2) = ... = ... square units.

c The area of rectangle = ... = ... square units.

d The area of trapezium = ... = ... square units.

16 Find the area of the following trapeziums:



a The area of shape (1) = ... = ... square units.

b The area of shape (2) = ... = ... square units.

c The area of shape (3) = ... = ... square units.

d The area of shape (4) = ... = ... square units.

17 A rectangular prism has dimension of 7 cm, 5 cm, and 3 cm. Find the surface area.

....

18 A tank in the shape of a cube, its edge length is 10 cm. Find:



ⓐ The area of one face: ....

ⓑ The surface area: ....

19 Which is greater in surface area: A cube of edge length is 9 cm, or a cuboid with dimensions of 11 cm , 6 cm and 2 cm?

....

....

20 In the following square pyramid:



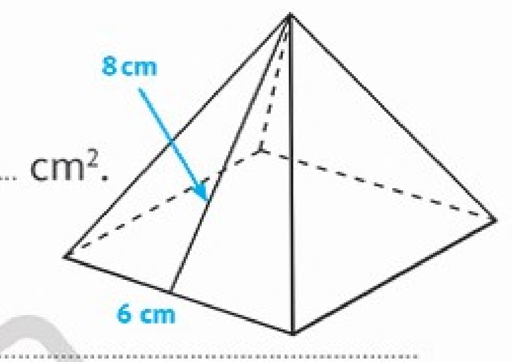
- The area of base = ... = ... cm^2.



- The area of the triangular face = ... = ... cm^2.



- Surface area = ... + ... = ... cm^2.



....

21 In the following square pyramid:

- The area of base

= .... cm^2.



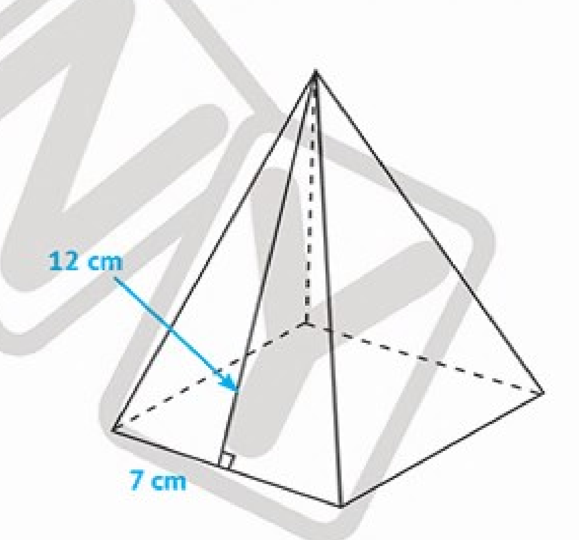
- The area of the triangular face



= .... cm^2.



- Surface area = ... + ... = ... cm^2.

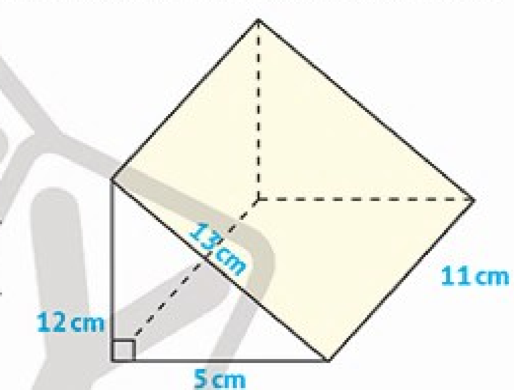


22 Murad made a square-based pyramid from wood. If the side of the square is 4 cm, and the height of the triangular face is 8 cm. Calculate the surface area of the box.

....

....

23 Using the opposite figure, find the surface area.

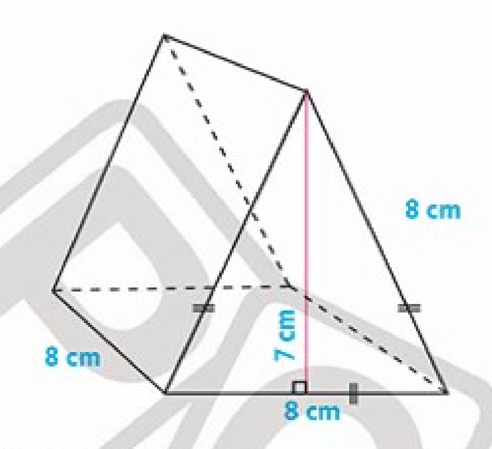


....

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24 Find the surface area of the following:

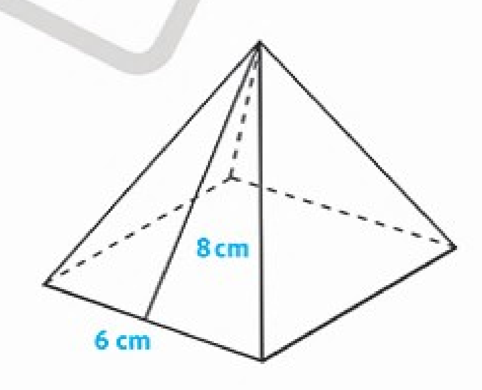




Surface area = ...

....



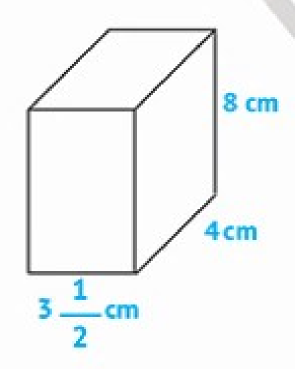


Surface area = ...

....

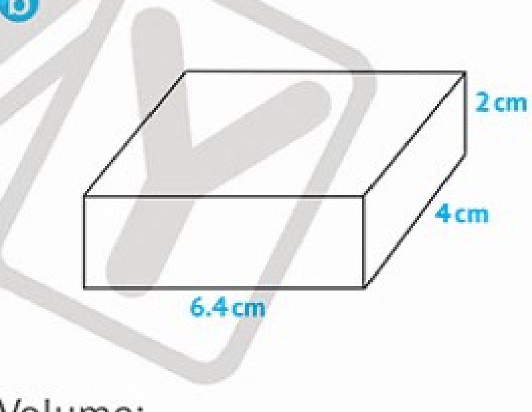
25 Find the volume of the following solids:





Volume: ....

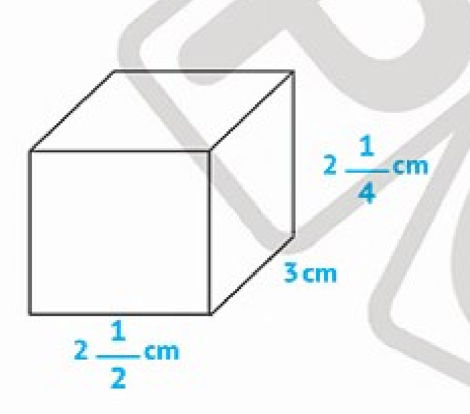




Volume: ....

26 Find the volume of the following solids:

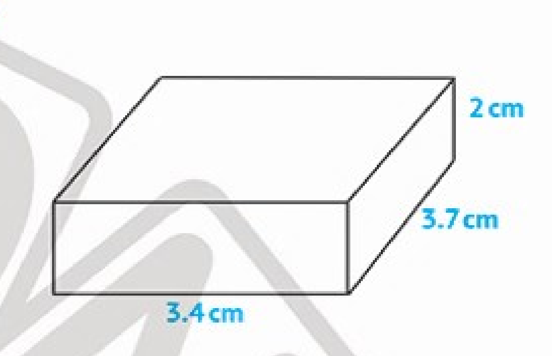
a



Actual volume: ....

Estimating volume = ...

b



Actual volume: ....

Estimating volume = ...

27 A cuboid with dimensions of $4\frac{1}{2}$ cm, 8 cm, and 2.5 cm. If one of its dimensions has been doubled, find the volume of the new cuboid.

....

28 A swimming pool with dimensions of 5 m, 4 m, and 2 m. If its dimensions have been doubled, then find the new volume.

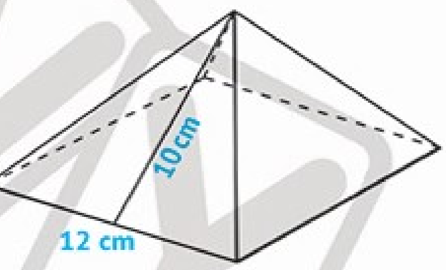
....

29 If the volume of a cuboid is 810 cm^3, and its height is 10 cm, find its base area. ....

....

30 In the opposite square pyramid, calculate the surface area. ....

....



31 If the base area of a cuboid is 36 cm^2, and its height is 5 cm, find the volume of the cuboid.

....

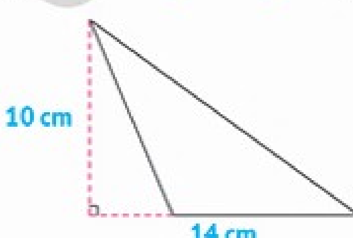
Model Exams

Model



First: Choose the correct answer:

1. $1.75 \div 0.5 =$ .... (35 or 3.5 or 0.35 or 0.035)
2. The reciprocal of 7 is .... $(7 \text{ or } \frac{1}{7} \text{ or } -7 \text{ or } -\frac{1}{7})$
3. All the following points lie on the y-axis, except ....
   ((0 , 1) or (1 , 4) or (0 , − 7) or (0 , 5))
4. If the side length of the rhombus is 8 cm and its height is 3 cm, then its area is ....cm^2. (48 or 24 or 12 or 11)
5. The area of the opposite triangle is .... cm^2.
   (70 or 24 or 140 or 56)



6. All the following are equivalent to 80%, except ....
   $(0.8 \text{ or } 0.80 \text{ or } \frac{8}{10} \text{ or } \frac{8}{100})$
7. $1.2 \text{ kg} \times \frac{\dots}{\dots} = 1{,}200 \text{ gm}$ $(\frac{1{,}000 \text{ gm}}{1 \text{ kg}} \text{ or } \frac{1 \text{ kg}}{1{,}000 \text{ kg}} \text{ or } \frac{1 \text{ km}}{100 \text{ gm}} \text{ or } \frac{100 \text{ gm}}{1 \text{ kg}})$

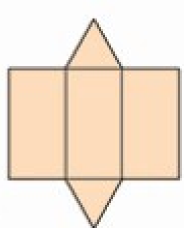
Second: Complete the following:

1. $9 \div \frac{1}{3} =$ ....
2. 97% = ... (As a decimal)
3. The surface area of the cube with edge length S = ...
4. If the dimensions of a cuboid are 8 cm, 5 cm, and 4 cm, then its volume is .... cm^3.
5. If a fruit seller has 45 kg of apples and 50 kg of oranges, then the ratio between the weights of apples to oranges in the simplest form is .... : ....

6 Nada bought tools for 400 LE; by adding 10% taxes, the total she paid is .... pounds.

7 If the two sides of the right angle in a right-angled triangle are 3 cm, and 4 cm, then its area is .... cm^2.

8 After folding the corresponding shape, a three-dimensional shape is formed, which is a ....



Third: Choose the correct answer:

1 $\frac{48}{36}$ = ... (In the simplest form) ($\frac{3}{4}$ or $\frac{4}{3}$ or $\frac{6}{8}$ or $\frac{18}{24}$)

2 The area of a rhombus that has a side length of 8 cm and a height of 5 cm is ...... cm^2.
(26 or 40 or 20 or 13)

3 In (-4 , 3), the x-coordinate is .... (7 or −4 or 4 or 3)

4 If 10% of 300 is 30, then 60% of 300 is .... (120 or 160 or 180 or 200)

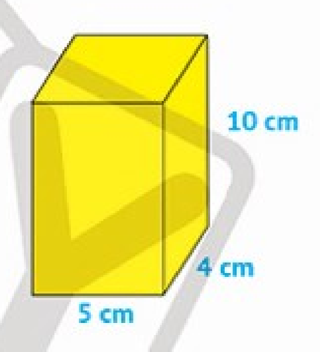
5 The image of the point (2 , 2) by reflection across the y-axis is ....
((2 , −2) or (−2 , −2) or (2 , 2) or (−2 , 2))

6 The reciprocal of 4 is .... ($\frac{4}{1}$ or −4 or $\frac{1}{4}$ or $\frac{4}{4}$)

7 $\frac{3}{15} \div \frac{6}{5}$ = ... km. ($\frac{1}{6}$ or $\frac{2}{5}$ or 6 or $\frac{6}{15}$)

Fourth: Answer the following:

1 The **surface area** of the opposite cuboid is ....



2 Manar bought **4.5** meters of cloth. If the price of each meter is **20.5** LE, find the price of the cloths.

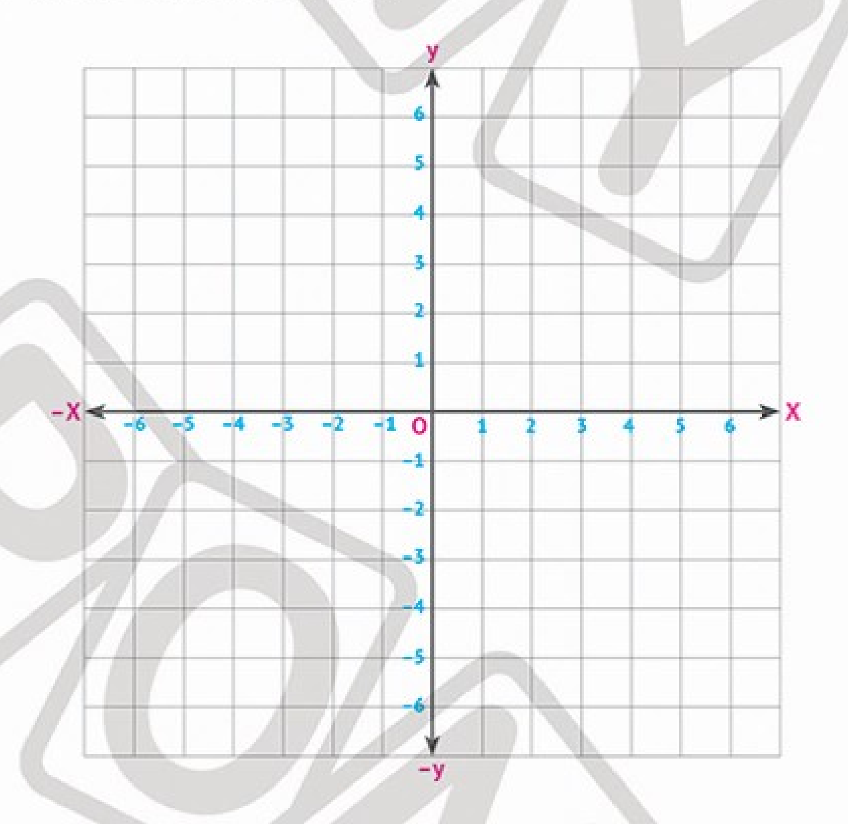
....

....

3 The following table shows the **purchase** of a computer before the discount. Complete the table.

Before the Discount	15% off	After the Discount
12,000 pounds	....	....

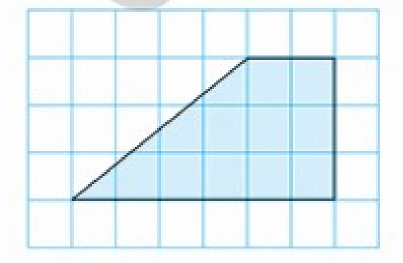
4 The point A **(3 , 3)** represents one of the vertices of a triangle. If the side length of the square equals **3** units, draw the square and then write the coordinates of the other vertices.



Model 

First: Choose the correct answer:

1. Tamer has 200 pounds, and his brother has 50 pounds. The ratio between what Tamer has and what his brother has is .... ($\frac{4}{1}$ or $\frac{1}{4}$ or $\frac{1}{3}$ or 0.4)
2. Assuming that you have a cube with one side area of 25 cm^2, then its surface area is equal to ....cm^2. (25 or 100 or 125 or 150)
3. 1 = ... % (0.1 or 1 or 10 or 100)
4. If the point (k , 3) is the image of point (4 , 3) by reflection on the y-axis, then the value of k is .... (3 or – 4 or – 3 or 4)
5. The area of the corresponding trapezium is equal to .... square units. (28 or 48 or 12 or 8)



6. 4.8 ÷ 0.8 ☐ 48 ÷ 8 (> or < or = or otherwise)
7. 12% of 300 LE = ...LE. (100 or 12 or 24 or 36)

Second: Complete the following:

1. $\frac{8}{10}$ = ... %
2. 0.625 ÷ 0.05 = ...
3. The volume of the rectangular prism = ...
4. Using the corresponding ratio table, The number of bottles needed for 18 liters of water is ....

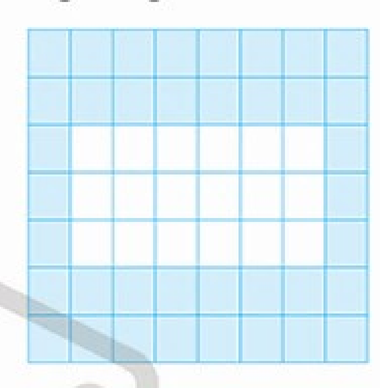
Number of Liters	3	18
Number of Water Bottles	2	....

5. 4 hours X .... = 240 minutes.

6 In a triangular prism, if the triangular bases are equilateral triangles, then all the rectangular faces will be ....

7 Area of the triangle = ... x Its corresponding height.

8 In the corresponding figure, the ratio between the number of white squares to the number of blue squares is .... : ....



Third: **Choose the correct answer:**

1 36 : 48 = ... (In the simplest form)

(3 : 4 or 4 : 3 or 6 : 8 or 18 : 24)

2 If the ratio $\frac{4}{5}$ is equivalent to the ratio $\frac{b}{60}$, then b = ...

(59 or 48 or $\frac{1}{4}$ or $\frac{48}{60}$)

3 The value of the coordinate y in the ordered pair (−9 , 12) is ....

(9 or −12 or −9 or 12)

4 If 10% of 420 is 42, then 15% of 420 is .... (21 or 42 or 63 or 84)

5 If a square pyramid has a square base of side length 6 cm and the height of each face is 4 cm, the surface area of the pyramid is ....

(84 or 48 or 36 or 24)

6 If a cube has an edge length of 1.5 cm, then its surface area is .... cm^2.

(15 or 13.5 or 20 or 10)

7 Nada wrote 270 words on the computer in 3 minutes. What is the unit rate of Nada's performance?

(90 words per second or 90 words per minute or 180 words per minute or 90 words per 5 seconds)

Fourth: Answer the following:

1 A merchant sold **30** kilograms of bananas at a price of **17.5** pounds per kilogram. Calculate the price of the quantity of bananas.

....

....

2 The following table shows an **invoice** for **purchasing** school supplies. Read the data, then complete the table.



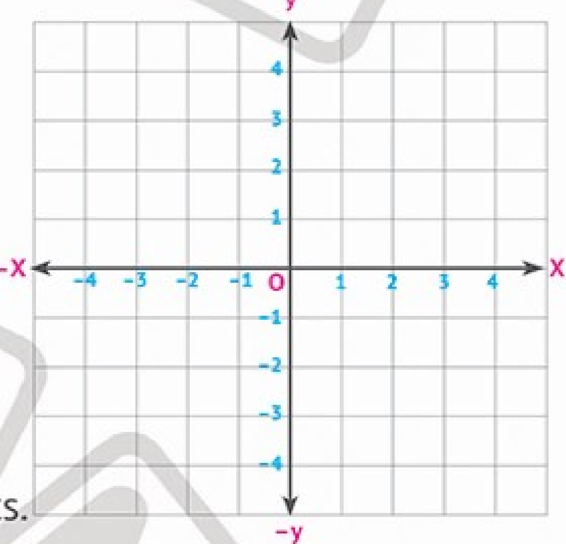
School Supplies Price	10% Tax	Total Price
620 pounds	....	....

3 The points (3 , −2) and (3 , 2) are the vertices of a rectangle; its length is **4** units and its width is **3** units.

ⓐ Draw the rectangle.

ⓑ Write the coordinates of the vertices of the rectangle.

ⓒ Area of the rectangle = ... square units.



4 Which is **larger**, the area of a triangle with a base length of **12** m and a height corresponding to this base of **18** m, or the area of a parallelogram with a base length of **12** m and a height corresponding to this base of **7** m?

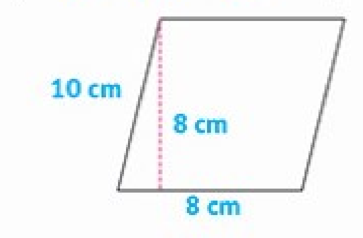
....

....

Model 3

First: Choose the correct answer:

1. Which of the following numerical expressions can be used to verify the division process $\frac{3}{5} \div 3 = \frac{1}{5}$? ($3 \div \frac{1}{5}$ or $\frac{3}{5} \times \frac{1}{5}$ or $3 \times \frac{1}{5}$ or $\frac{3}{5} \div \frac{1}{5}$)
2. If a rectangular prism has a base area of 14 cm^2 and a height of 4 cm, then its volume is .... (10 cm^3 or 18 cm^3 or 56 cm^3 or 144 cm^3)
3. In the sixth grade of a primary school, if the ratio between boys to girls is 5 : 4, and the number of boys is 80 students, then the number of girls is .... (16 or 100 or 64 or 144)
4. The distance between the point (− 4 , 6) and the y-axis is .... units. (6 or 0 or 4 or − 4)
5. In the corresponding figure, the area of the parallelogram is equal to .... cm^2.



(64 or 80 or 40 or 32)

6. $\frac{3}{4}$ = ... (0.3 or 4% or 25% or 75%)
7. If a water tap is used to fill a 24 m^3 tank in 3 hours, then the unit rate is equal to .... LE. (12 m^3 in 2 hours or 8 liters per hour or 8 m^3 in an hour or 8 litres per hour)

Second: Complete the following:

1. 18% = ... (Decimal form)
2. 84 : 56 = ... : ...... (In the simplest form)
3. The ratio 4 : 9 is equivalent to the ratio 16 : ....
4. 0.06 X 0.2 = ...

5 If the packages containing $10\frac{1}{2}$ liters of oil are put in containers with a capacity of $\frac{3}{8}$ liters each, then the number of needed containers is equal to .... containers.

6 If $\frac{12}{27} = \frac{4}{9}$, then 27 X 4 equals .... X ....

7 A garden is in the shape of a right-angled triangle; if the two sides of the right angle are 8 m and 8 m, then its area is equal to .... m^2.

8 The conversion factor that can be used to convert from minutes to hours is ....

Third: Choose the correct answer:

1 8.8 ÷ 1.1 ☐ 8.8 ÷ 0.8 (> or < or = or none)

2 If a square pyramid has a base length of 120 m and the height of its triangular faces is 30 m, then its surface area is .... m^2.

(3,600 or 1,800 or 21,600 or 10,800)

3 The distance between the two numbers (− 4) and (− 6) on the number line is equal to .... units. (6 or 4 or 2 or 10)

4 Which of the following mathematical expressions expresses $\frac{1}{8}$ of $\frac{1}{2}$?

($\frac{1}{2} + \frac{1}{8}$ or $\frac{1}{8} \div \frac{1}{2}$ or $\frac{1}{2} \div \frac{1}{8}$ or $\frac{1}{2} \times \frac{1}{8}$)

5 All the following ordered pairs are in the fourth quadrant, except the ordered pair .... ((9 , −1) or (−2 , 2) or (1 , −5) or (2 , −2))

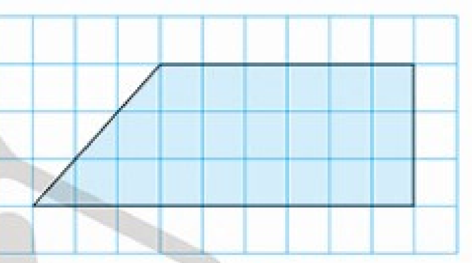
6 If a rectangular prism has a length of 3 m, a width of 1.3 m, and a height of 5 m, so its volume is .... m^3. (15 or 9.3 or 195 or 19.5)

7 A car is moving at a rate of 60 km per hour. If the car continues at the same rate, then the distance covered in an hour and a quarter is ....

(45 km or 90 km or 75 km or 70 km)

Fourth: Answer the following:

1 Calculate the **area** of the corresponding trapezium.



....

....

2 Which is **larger**, the area of a triangle with a base length of **12** cm and a height of **8** cm, or the area of a parallelogram with a base length of **8** cm and a height corresponding to this base of **8** cm?

....

....

3 If the time specified for Faten to practice running and swimming is **80** minutes, and **30%** of the time is spent practicing running, how much time is left in minutes to practice swimming?

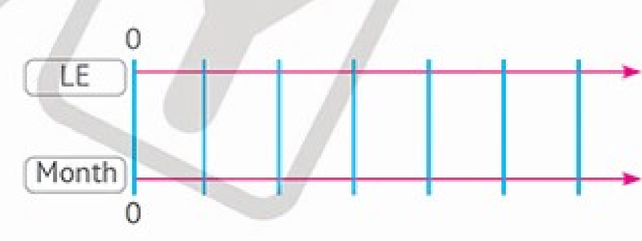
....

....

4 Adel saves a fixed monthly amount of **250** pounds. Use the corresponding double number line to represent the savings values. Determine the total savings in the sixth month.

....

....



Model 4



First: Choose the correct answer:

1. $\frac{3}{4} \div 3 =$ .... ($\frac{1}{4}$ or $\frac{1}{12}$ or $\frac{9}{4}$ or 4)

2. The point (3 , − 3) by reflection on the x-axis is ....

   ((− 3 , − 3) or (3 , −3) or (−3 , 3) or (3 , 3))

3. Which of the following is not equivalent to the ratio 3 : 10?

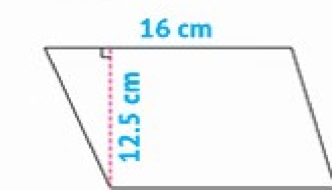
   (3% or 30% or 0.30 or $\frac{3}{10}$)

4. The distance between the point (−1 , 0) and the y-axis is ....

   (1 or 0 or 2 or 3)

5. The area of the opposite parallelogram is equal to .... cm^2.

   (100 or 50 or 200 or 400)



6. Which of the following rates is better?

   (12 pounds per 2 kilograms of oranges or 60 pounds per 5 kilograms of oranges or 15 pounds per 3 kilograms of oranges or 32 pounds per 8 kilograms of oranges)

7. 720 seconds X .... = 12 minutes.

   ($\frac{1 \text{ minute}}{60 \text{ seconds}}$ or $\frac{60 \text{ seconds}}{1 \text{ minute}}$ or $\frac{12 \text{ minutes}}{60 \text{ seconds}}$ or $\frac{720 \text{ seconds}}{1 \text{ minute}}$)

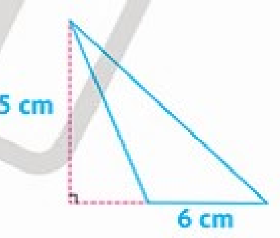
Second: Complete the following:



1. 23% from 200 is ....

2. 8 : 16 = ... : .... (In its simplest form)

3. The area of the corresponding triangle = ... cm^2.



4 If a cube has an edge length of 10 cm, then its surface area is .... cm^2.

5 The ratio between the length of the tree and the length of the lighting pole is 4 : 3. If the length of the tree is 12 m, then the length of the lighting pole is .... m.

6 0.96 ÷ 0.08 = ...

7 7.8 ÷ 3.9 = 78 ÷ ....

8 From the corresponding double number line, the unit rate is equal to ....



Third: **Choose the correct answer:**

1 $\frac{3}{8} \div \frac{1}{16} =$ .... ($\frac{3}{24}$ or 6 or 3 or 2)

2 If dimensions of a rectangular prism are 10.1 meters, 8 meters, and 5 meters, then its volume is .... cm^3. (404 or 202 or 400 or 40.4)

3 The x-coordinate in the ordered pair (−7 , 7) is ....

(0 or 14 or − 7 or 7)

4 $\frac{5}{10} =$ .... (50% or 80% or 90% or 100%)

5 The point (−3 , 0) lies ....

(in the first quarter or in the second quarter or on the x-axis or on the y-axis)

6 If a square pyramid has a base area of 144 cm^2 and the area of its faces is 48 cm^2, so its surface area is .... cm^2. (96 or 240 or 162 or 336)

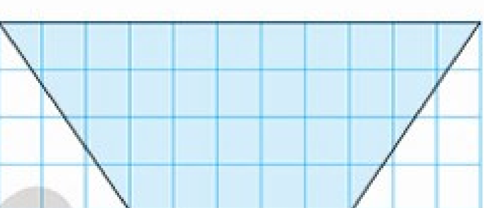
7 The percentage that represents the shaded parts in the corresponding model is equal to ....

(2% or 20% or 80% or 0.2%)

Fourth: Answer the following:

1. Find the **area** of the corresponding trapezium.





....

....

2. A box in the form of a rectangular prism has dimensions of **30** cm, **15** cm, and **10** cm. Calculate the **volume** of the box.

....

....

3. Maryam bought **8** tickets to the zoo. The price of one ticket equals 90 pounds. If she got a **10%** discount on its price, calculate the **discount value**.

....

....

4. The corresponding double number line shows the number of kilometers tracked in time in minutes. Determine the **time** required to cover a distance of **450** km.

Minutes	0	2	4	6	8	10
Km	0	45	90	135	180	225

....

....

....

....

Model 5

First: Choose the correct answer:

1. 24% of 700 is .... (168 or $\frac{6}{25}$ or 24 or 72)

2. The point (3 , – 3) by reflection on the y-axis is ....

   ((– 3 , – 3) or (3 , –3) or (–3 , 3) or (3 , 3))

3. Which of the following is not equivalent to the ratio 7 : 10?

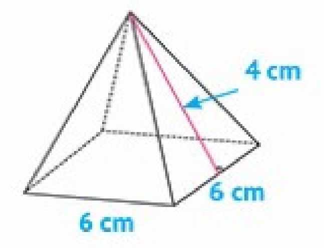
   (7% or 0.70 or $\frac{7}{10}$ or 70%)

4. The distance between the point (–1 , 3) and the y-axis is .... units.

   (1 or 0 or 2 or 3)

5. The area of the base in the corresponding pyramid shape is equal to .... cm^2.


   (96 or 132 or 36 or 24)



6. All the following points are 5 units away from the position of the point (0 , 0), except .... ((0 , 5) or (–5 , 0) or (5 , 0) or (5 , 5))

7. All the following ratios are equivalent to $\frac{7}{11}$, except ....

   ($\frac{70}{110}$ or $\frac{21}{33}$ or $\frac{14}{18}$ or $\frac{14}{22}$)

Second: Complete the following:

1. 0.6 km per minute = ... km/hour.

2. 48% = ... (With a common fraction in the simplest form)

3. The volume of the rectangular prism = ... X Height.

4 If a cube has an edge length of 1 cm, its surface area is equal to

.... cm^2.

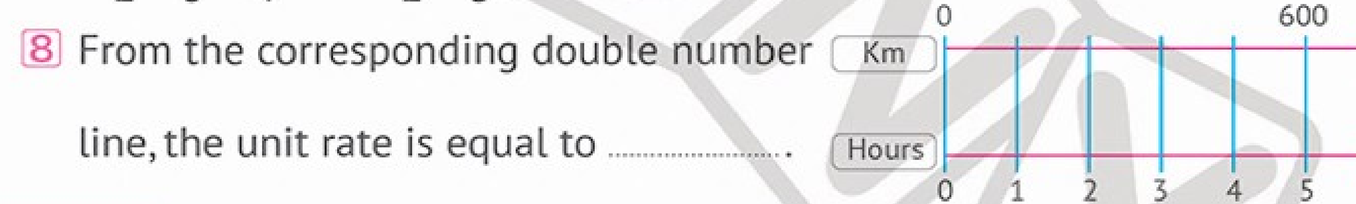


5 A number of which 70% is equal to 140 is ....

6 $12.1 \div 0.11 =$ ....

7 If $\frac{1}{2} = \frac{2}{3} \times \frac{3}{4}$, then $\frac{1}{2} \div \frac{2}{3}$ is equal to ....

8 From the corresponding double number line, the unit rate is equal to ....



Third: Choose the correct answer:

1 $7 \times \frac{1}{7}$ ☐ $7 \div \frac{1}{7}$ (> or < or = or none)

2 If a cube has an edge length of 6 cm, its surface area is .... cm^2.

(24 or 36 or 144 or 216)

3 The y-coordinate in the ordered pair (−5 , 5) is ....

(5 or − 5 or 0 or 10)

4 96% of 380 is closer to .... (400 or 324 or 180 or 360)

5 The point (5 , 9) is located in the .... (first quadrant or second quadrant or third quadrant or fourth quadrant)

6 If a square pyramid has a base area of 40 cm^2 and the area of one of its faces is 15 cm^2, then its surface area is ...... cm^2. (100 or 85 or 60 or 55)

7 The number that expresses the percentage 50% of 700 is ....

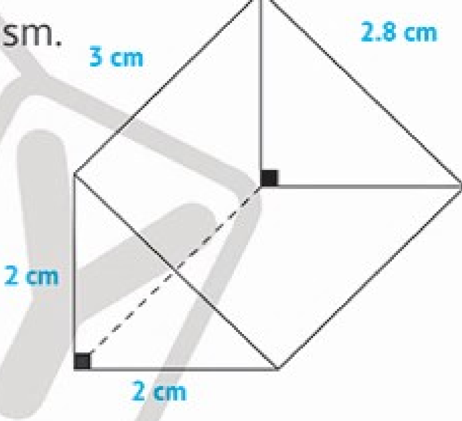
(300 or 400 or 250 or 350)

Fourth: Answer the following:

1. **How many** $\frac{1}{9}$ are in $\frac{2}{3}$? Explain your answer.



2. Calculate the **surface area** of the opposite prism.

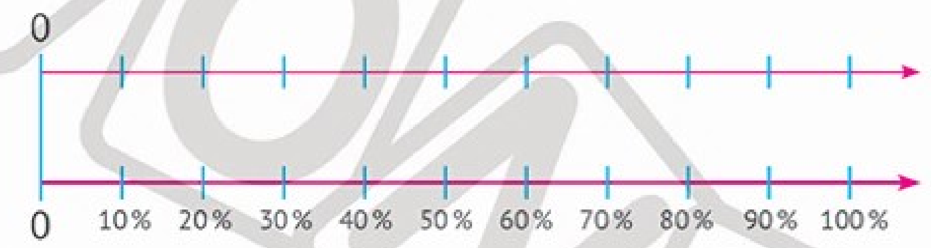


3. Find the **area** of the opposite figure.



4. Maha got a score of **40** in the mathematics test. She got **80%** in the test.

   Use the following double number line to show the total test score.



Model 6

First: Choose the correct answer:

1. $\frac{3}{5} \div \frac{1}{5} = \dots\dots$ ($\frac{4}{5}$ or $\frac{2}{5}$ or $\frac{1}{5}$ or 3)

2. The image of the point (5 , 5) by reflection on the x-axis is ....

   ((0 , 5) or (− 5 , 5) or (5 , −5) or (−5 , −5))

3. Which of the following isn't an equivalent ratio to 3 : 4?

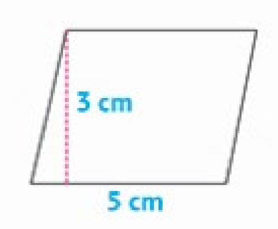
   (75% or $\frac{6}{8}$ or 0.75 or $\frac{5}{4}$)

4. The distance between (−3 , 4) and the x-axis is .... units.

   (3 or 4 or 7 or 1)

5. The area of the opposite parallelogram is .... cm^2.

   (7.5 or 12 or 15 or 30)



6. Which of the following is the lowest cost in buying?

   (80 LE per 2 meters or 50 LE per a meter or 55 LE per a meter or 100 LE per 3 meters)

7. 9 km X $\frac{\dots}{\dots}$ = 9000 m. ($\frac{1{,}000 \text{ m}}{1 \text{ km}}$ or $\frac{1{,}000 \text{ g}}{1 \text{ kg}}$ or $\frac{100}{1 \text{ km}}$ or $\frac{1 \text{ km}}{1{,}000 \text{ m}}$)

Second: Complete the following:

1. 80% = $\frac{\dots\dots}{\dots\dots}$ (As a fraction)

2. 8 : 16 = ... : .... (In the simplest form)

3. The area of the rhombus = ... x ....

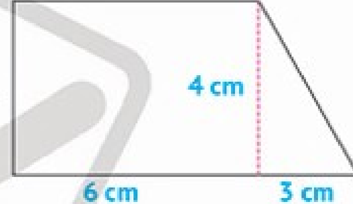
4 If a cube has an edge of 5 cm in length, then its surface area is .... cm^2.

5 If the ratio of what Ahmed has to what Amany has is 3 : 5, and Amany has 50 LE, then Ahmed has .... LE.

6 12.5 X 2.5 = ...

7 Belal cuts a piece of wood of length 20 m into equal parts of $\frac{1}{5}$ m long; then the number of parts is .... parts.

8 The area of the opposite trapezium is .... cm^2.



Third: Choose the correct answer:

1 3.2 ÷ 0.4 ☐ 32 ÷ 4 (> or < or = or otherwise)

2 The number of heights of the right-angled triangle is ....

(1 or 2 or 3 or 5)

3 The distance between 4 and −4 on the number line equals .... units.

(0 or 4 or 8 or 16)

4 50% of 360 equals .... (50 or 100 or 180 or 360)

5 Which of the following describes the relation $\frac{1}{2}$ of $\frac{1}{4}$ km?

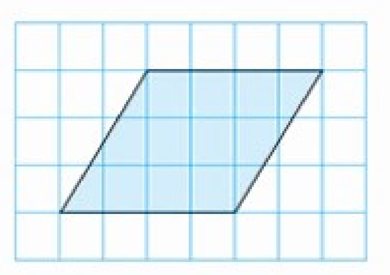
($\frac{1}{2} \times \frac{1}{4}$ or $\frac{1}{4} \div \frac{1}{2}$ or $\frac{1}{2} \div \frac{1}{2}$ or $\frac{1}{2} + \frac{1}{4}$)

6 If a square-based pyramid has a base area of 40 cm^2 and the area of its side is 15 cm^2, then its surface area is .... cm^2. (55 or 60 or 85 or 100)

7 A car travels at a speed of 90 km/hr. The distance traveled in two and a half hours is .... km. (18 or 180 or 270 or 225)

Fourth: Answer the following:

1 Calculate the **area** of the opposite parallelogram.



....

2 Which is **greater**: The area of a triangle whose base is **12** cm and its corresponding height is **8** cm, or the area of a parallelogram whose base is **8** cm and its corresponding height **4** cm?

....

....

3 A dinner bill is **600** LE. There's a **15%** tax. Calculate the bill **after** adding the tax.

....

....

4 In the following table:

No. of Cake Pieces	4	16
No. of Kg of Flour	0.5	x

- How many kilograms of flour are needed to make **16** pieces of cake?

....

....

Model 7

First: Choose the correct answer:

1. Which of the following is equivalent to $\frac{1}{4} \div 8$?

   ($\frac{1}{4} \div \frac{1}{8}$ or $2 \times \frac{1}{8}$ or $\frac{1}{4} \times \frac{1}{8}$ or $2 \div \frac{1}{8}$)

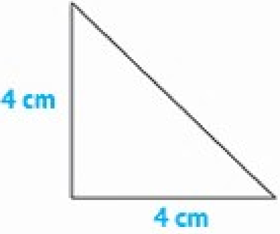
2. If a cuboid has a base area of 32 cm^2 and a height of 4 cm, then its volume is .... cm^3. (8 or 128 or 36 or 64)

3. In a class, if the ratio between the number of girls and boys is 3 : 2, and the number of boys is 16, then the number of girls is ....

   (8 or 24 or 40 or 80)

4. The distance between the point (7 , 3) and the y-axis is .... units.

   (3 or 4 or 7 or 10)



5. The area of the opposite triangle is .... cm^2.

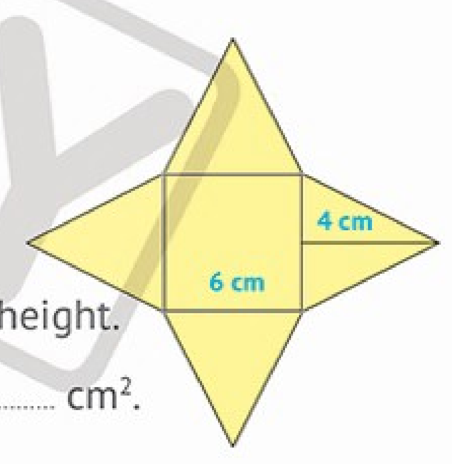
   (32 or 16 or 8 or 4)

6. $\frac{1}{4}$ = ... (0.4 or 4% or 25% or 40%)

7. If a car covered 180 km in 3 hours, then the unit rate is ....

   (12 km per 2 hours or 60 km per hour or 15 km per quarter hour or 300 km per 5 hours)

Second: Complete the following:



1. The reciprocal of $\frac{4}{5}$ is ....

2. 21 : 14 = ... : ....

3. Area of the triangle = ... X corresponding height.

4. The surface area of the opposite figure is .... cm^2.



5 If 10% of 45 LE is 4.5 LE, then 30% of 45 LE equals ....

6 If $\frac{3}{7} = \frac{6}{14}$, then 3 X 14 = ...

7 If the side length of a square garden is 7.5 m, then its area is .... m^2.

8 The conversion factor used to convert from hours to minutes is ....

Third: Choose the correct answer:

1 7 X 7 ☐ 7 ÷ $\frac{1}{7}$ (> or < or = or otherwise)

2 If a cube has an edge of 6 cm, then its surface area is .... cm^2.

(216 or 144 or 36 or 24)

3 The y-coordinate in the ordered pair (3 , 5) is .... (2 or 3 or 5 or 8)

4 25% of 720 equals .... (50 or 100 or 180 or 360)

5 The point (−3 , −3) lies in the .... quadrant.

(first or second or third or fourth)

6 The base area of a square-based pyramid is 25 cm^2 and the area of its side is 15 cm^2, then its surface area is .... cm^2. (55 or 60 or 85 or 100)

7 Ahmed paid 400 LE for 8 cinema tickets. Which of the following is considered the rate for that situation?

(50 LE per a ticket or 3,200 LE per 8 tickets or 50 LE per 8 tickets or 40 LE per a ticket)

Fourth: Answer the following:

1 A portrait is in the shape of a rectangle. If its area is **2** m^2 and its width is $\frac{1}{2}$ m, then what is its **length**?

....

2 A present is in the shape of a cuboid. Its dimensions are **20** cm, **15** cm, and **10** cm. Mariam wants to cover it with decoration paper. Find the **area** of the paper needed to cover that present?

....

....

3 A dinner bill is **400** LE. There's a **10%** tax. Calculate the bill **after** adding the tax.

....

....

4 Sandy wants to cut a wire of length $\frac{3}{5}$ m into equal parts of $\frac{1}{25}$ m each. Find the **number of parts**.

....

....

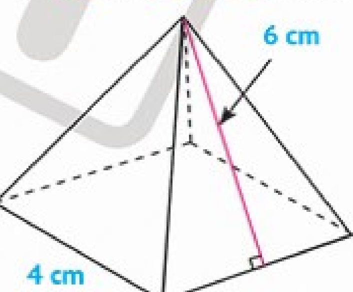
Model  8

First: Choose the correct answer:

1. 70% of 30 LE is .... LE. (210 or 100 or 40 or 21)
2. The reciprocal of 3 is .... (-3 or 1 or $\frac{1}{3}$ or $-\frac{1}{8}$)
3. If a triangle has a base length of 16 cm and its corresponding height is 12 cm, then its area is .... cm^2. (28 or 48 or 96 or 192)
4. To represent the point $(4, -9)$, we move horizontally to the right .... units. (4 or 5 or 9 or 13)
5. In the opposite figure:

   The surface area is .... cm^2.

   (12 or 16 or 28 or 64)



6. All the following are equivalent to the unit rate: 2 goals per match, except ....

   (6 goals per 3 matches or 18 goals per 9 matches or 8 goals per 6 matches or 14 goals per 7 matches)
7. 180 minutes x $\frac{\text{..........}}{\text{..........}}$ = 3 hours.

   ($\frac{1 \text{ hr}}{60 \text{ minutes}}$ or $\frac{1 \text{ minute}}{60 \text{ hours}}$ or $\frac{1 \text{ hr}}{180 \text{ minutes}}$ or $\frac{60 \text{ minutes}}{1 \text{ hr}}$)

Second: Complete the following:

1. $\frac{3}{10}$ (In percentage form) = ...
2. If a square has a side length of 5 cm, then its area is .... cm^2.

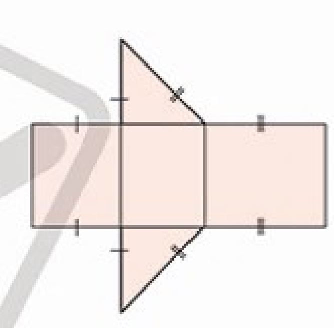
3 If a rectangular prism whose dimensions are 3 m, 4 m, and 5 m has been doubled to become 6 m, 8 m, and 10 m, then the ratio between the original volume and the new volume is .... : ....

4 $12.5 \div 2.5 =$ .... $\div 25$

5 If a shirt is 200 LE with 5% off, then the sale price is .... LE.

6 If a cube has an edge of 4 cm, then its surface area is .... cm^2.

7 By folding the opposite shape, the solid formed is ....



8 $\frac{3}{8} \div 8 =$ ....

Third: Choose the correct answer:

1 23.56×0.6 ☐ 23.56×6 (> or < or = or otherwise)

2 If a rhombus has a side length of 6 cm and a height of 15 cm, then its area is .... cm^2. (180 or 90 or 45 or 27)

3 The distance between the two points (−7 , 2) and (9 , 2) equals .... units. (0 or 4 or 8 or 16)

4 100% is equivalent to .... (100 or 10 or 1 or 0.1)

5 The following ordered pairs: (2 , 4), (6 , 4), (6 , 2), and (2 , 2) represent the vertices of a .... (triangle or square or trapezium or rectangle)

6 If the dimensions of a cuboid are 5 m, 5 m, and 4 m, then its volume is .... m^3. (200 or 120 or 100 or 15)

7 The reflection image of (−2 , 5) on the y−axis is ....
((5 , −2) or (2 , 5) or (−2 , −5) or (2 , −5))

Fourth: Answer the following:

1. Find the **surface area** of a rectangular prism whose length is **6.5** cm, width is **3** cm, and height is **4** cm.

....

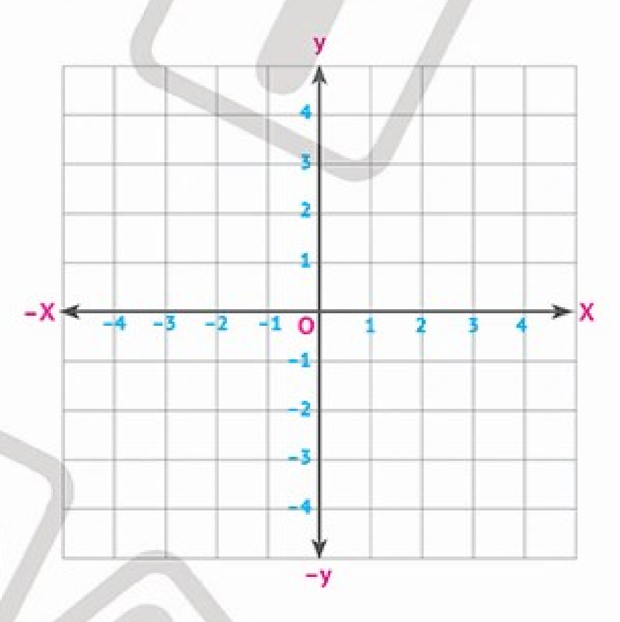
2. Write **three** ratios equivalent to **5 : 30**.

....

3. A TV is **8,500** LE. If there's **10%** off, calculate the **saved money**.

....

4. Ahmed drew a shape with the coordinate points **(3 , −3)**, **(−3 , −1)**, and **(2 , 2)**. Is the shape an **acute triangle**?



....

....

....

....

Model 9

First: Choose the correct answer:

1. $1.2 \times 1.2 =$ .... (144 or 14.4 or 1.44 or 0.144)

2. The image of reflection of (0 , 5) on the x−axis is ....

   ((5 , 5) or (0 , −5) or (5 , 0) or (−5 , 0))

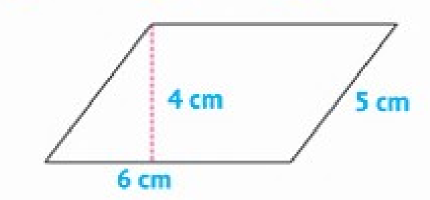
3. If a cube has an edge of 7 cm, then its surface area is .... cm^2.

   (49 or 21 or 343 or 294)

4. If a square has a side length of 5 cm and its perimeter is 20 cm, then the ratio between its side and its perimeter is .... : ....

   (1 : 4 or 1 : 5 or 5 : 1 or 4 : 1)

5. The area of the opposite parallelogram is .... cm^2.



   (12 or 18 or 24 or 27)

6. All the following represent the rate of 4 factories of ceramic. The highest production rate is ....

   (200 cartons per hour or 480 cartons per hour or 300 cartons per hour or 760 cartons per hour)

7. The reciprocal of $\frac{2}{7}$ is .... ($\frac{5}{7}$ or $\frac{2}{7}$ or $-\frac{2}{7}$ or $\frac{7}{2}$)

Second: Complete the following:

1. 120 : 180 = ... : .... (In the simplest form)

2. 30% of 120 is ....

3 $\frac{5}{9} \div \frac{2}{3}$ = ...

4 0.256 X 100 = ...

5 If the dimensions of a cuboid are 1.2 cm, 10 cm, and 5 cm,

then its volume is .... cm^3.

6 If Mark has 20 books and 16 pens, then the ratio between the number

of books and the number of pens is .... : ....

7 If Amr earns 720 LE for working 9 hours, then the unit rate of his earning

is ....

8 The area of a triangle, whose base is 8 cm and its corresponding height

is 6 cm, is ....

Third: Choose the correct answer:

1 $5 \div \frac{4}{2}$ ☐ $5 \times \frac{4}{5}$ (> or < or = or otherwise)

2 Which of the following is an equivalent operation to $\frac{2}{3} \div \frac{1}{6}$?

($4 + \frac{2}{3}$ or $\frac{2}{3}$ or $\frac{2}{3} \times 6$ or $4 \times \frac{2}{3}$ or $4 \times \frac{1}{4}$)

3 The ordered pairs (0 , 0), (0 , −2), (−2 , −2), and (−2 , 0) represent the

vertices of a .... (triangle or square or trapezium or rectangle)

4 The .... is a rate that compares the number of units of one quantity

to one unit of the second quantity.

(unit rate or percent or rate or conversion factor)

5 All the following ordered pairs lie in the 2^{nd} quadrant, except ....

((−7 , 5) or (2 , −2) or (−1 , 5) or (−2 , 2))

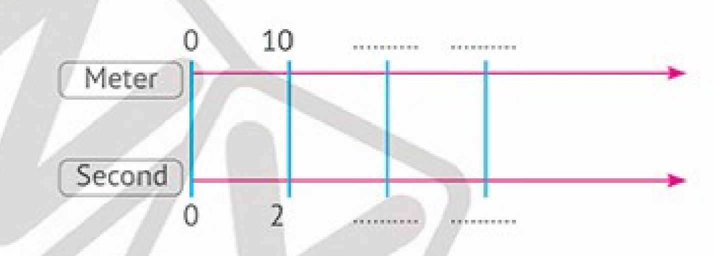
6 If a square-based pyramid has a base area of 80 cm^2 and the area of its sides is 30 cm^2, then its surface area is .... cm^2. (200 or 120 or 100 or 15)

7 60% of .... is 72. (60 or 120 or 160 or 180)

Fourth: Answer the following:

1 By using the opposite double line:

Calculate the **unit rate**, then find the **number of meters** covered in **5** seconds.

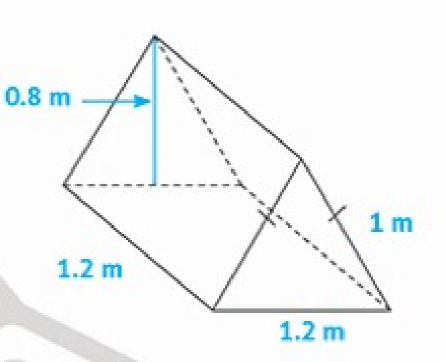


....

2 Nehal distributed **0.25 kg** into bags. If the mass of each bag is **0.01** kg, how many **bags** are needed?

....

3 Find the **area** of the opposite triangular prism.



....

....

4 Write **three** ratios equivalent to **7 : 35**.

....

Model 10

First: Choose the correct answer:

1. $\frac{3}{4}$ = ... % (75 or 2.5 or $\frac{1}{4}$ or 0.25)
2. A parallelogram that has a right angle is called a ....
   (square or rectangle or rhombus or trapezium)
3. 125 : 75 = ... : .... (5 : 3 or 5 : 4 or 2 : 3 or 3 : 5)
4. The surface area of a cuboid whose dimensions are 8 cm, 3 cm, and 7 cm is .... cm^2. (2 X 18 or 8 X 3 X 7 or 2 X (56 + 24 + 21) or 8 + 3 + 7)
5. 60% of .... is 360. (0.6 or 6 or 60 or 600)
6. The distance between (–6) and 5 on the number line is ....
   (1 or –1 or 11 or 5)
7. The reciprocal of $\frac{2}{7}$ is .... (2 or $\frac{7}{2}$ or 7 or $\frac{2}{7}$)

Second: Complete the following:

1. Farida spends 120 LE in 4 days, then the rate of what she spends is .... LE/day.
2. 4.5 ÷ 0.09 = ... ÷ 9
3. The number of heights of a scalene triangle is ....
4. The distance between A (3 , 7) and D (-2 , 7) is .... units.
5. If $\frac{x}{8} = \frac{3}{4}$, then x = ...
6. The x-coordinate of any point that lies on the y-axis is ....

7 If Gehan scored 540 marks out of 600, then the percentage of the marks she scored is ....

8 If the dimensions of a cuboid are 6 m, 7 m, and 2 m, then its volume is .... m^3.

Third: Choose the correct answer:

1 The area of the triangle = ... ($\frac{1}{2}$ b x h or b x h or W x L or $\frac{1}{4}$ b x h)

2 If we doubled one of the dimensions of a cuboid, then the ratio between the original cuboid and the new cuboid is .... : ....

(1 : 2 or 1 : 3 or 1 : 4 or 1 : 8)

3 $\frac{9}{18}$ = ... % (30 or 25 or 50 or 60)

4 If 4 : 7 = x : 35, then x – 3 = ...

(20 or 23 or 17 or 15)

5 The percentage that represents 340 LE of 1,000 LE is ....

(340% or 34% or 340% or 3.5%)

6 5% of .... LE is 120 LE. (240 or 2,400 or 1,200 or 120)

7 A cubic meter is a unit of measurement of ....

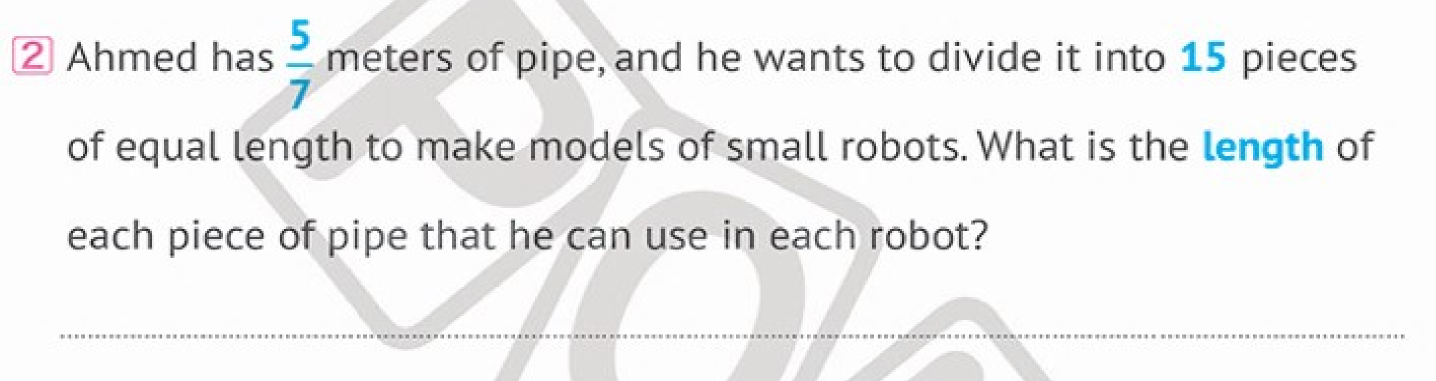
(capacity or mass or volume or time)

Fourth: Answer the following:

1 If a triangle has a base length of **20** cm and its corresponding height is **7** cm, find its **area**.

....

....



2 Ahmed has $\frac{5}{7}$ meters of pipe, and he wants to divide it into **15** pieces of equal length to make models of small robots. What is the **length** of each piece of pipe that he can use in each robot?

....

....

3 Mark bought **16** boxes of juice. The price of each one is **5.5** pounds. How many **pounds** did he **pay** the seller?

....

....

4 In the opposite figure:

Calculate the **surface area**.

....

....

....

